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DIAGNOSES OF TEN NEW CHILOPODS WITH A NEW GENUS OF SOGONIDÆ AND A KEY TO THE SPECIES OF LOPHOBIUS

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Of the eleven chilopods described in this paper, ten are named for the first time, while the eleventh was previously incompletely diagnosed. The types of all these species are in the author's collection.

Cryptops sinesicus Chamberlin, sp. nov.

Head overlapped by the first dorsal plate; without sulci. First plate not sulcate. Prehensors with claws of normal length; anterior margin of prosternum smooth and nearly straight, slightly obtusely indented to middle line, two setæ on each side just proximal of it. Paired dorsal sulci complete from third tergite caudad. Last ventral plate caudally widely rounded with middle part of margin straight or truncate. Last coxæ caudally subtruncate or slightly convex; pores of moderate size, numerous in an area rounded behind and not reaching caudal margin by a considerable distance, along ventral plate and reaching dorsal plate at proximal end of area; caudal margin setose, two or three setæ also proximal of end, one or more in prorigerous area. Anterior spiracles rather large, longitudinally subelliptic. Femur and tibia slightly notched on median line at distal end, rounded each side of notch but with no suggestion of processes; uniformly coarsely setose ventrally and laterally, the setæ finer on dorsal surface. Metatarsus with a series of eight teeth of which the most distal is abruptly much more robust, teeth decreasing in size proximad. First tarsal joint with a series of four teeth. Length, about 14 mm.

Locality. One specimen intercepted April 28, 1938, by quarantine inspector at Honolulu in soil about *Litchi chinensis* D. from China.

This species agrees in many features with *C. navis* Chamberlin from Singapore, Straits Settlement, but may readily be distinguished in having eight teeth on the metatarsus instead of five, etc.

Nipponobius cepeus Chamberlin, sp. nov.

Articles of antennæ 20, all rather short, with the ultimate nearly equal in length to the two preceding taken together. Ocelli 1 + 3, 2, those of lower series and the first or single ocellus much smaller, the single ocellus contiguous with the next one which is the largest. Prosternal teeth 2 + 2, pale. Ventral spines of anal legs, 0, 1, 2, 1, 0; dorsal spines, 1, 0, 2, 0, 0; claw single. Ventral spines of penultimate legs, 0, 1, 2, 1, 0; dorsal, 0, 0, 2, 0, 0; an accessory claw or spine present. Coxal pores small, circular, few in number. Claw of female gonopods tripartite, the teeth short; basal spines 2 + 2.

Locality. Japan. One female taken by plant quarantine inspector at Honolulu, April 11, 1938, in packing material about *Vandateres grandiflora*.

This species differs from *N. migrans* Chamberlin, the genotype, in having the claw of the anal legs single instead of double.

Oabius rodocki Chamberlin, sp. nov.

A brown-colored form related to *O. sastianus* in having the ventral spines of the anal legs normally 0, 1, 3, 3, 1 but differing in having the dorsal spines of the penultimate legs 1, 0, 3, 1, 0 instead of 1, 0, 3, 1, 1 and in having a slight dorsal lobe at the distal end of the fifth joint or metatarsus of the penultimate legs in the male. Antennæ short. Ocelli few, in three series. Posterior angles of eleventh and thirteenth dorsal plates slightly produced. Dorsal spines of the anal legs 1, 0, 3, 1, 0; the claw single. Ventral spines of the penultimate legs 0, 1, 3, 3, 2; the claw double. Only the last pair of coxæ laterally armed (female) or these also unarmed (male holotype). Last three pairs of coxæ dorsally armed. Ventral spines of the first pair of legs 0, 0, 1, 2, 1. Coxal pores small, circular, decreasing in size proximad on each coxa, in female allotype numbering 3, 4, 4, 4. Claw of female gonopods tripartite, the lobes short. Basal spines 2 + 2. Length of male holotype, 7.5 mm.; of female allotype, 10 mm.

Locality. Idaho: Spaulding. Taken under moist leaves in woods on November 18, 1939, by R. E. Rodock.

Oabius (Nyctobius) boyeranus Chamberlin, sp. nov.

Color pale brown, the head lighter; antennæ brown, the legs yellowish, the posterior pairs brightest. Antennæ short and attenuated, composed of twenty short articles. Ocelli 1 + 3, 2, the single ocellus largest, the anterior smallest. Prosternal teeth 2 + 2, uniform, small and pale; the median incision V-shaped. Legs with

tarsi relatively long, with suture more evident than usual. Ventral spines of anal legs 0, 1, 3, 2, 0; dorsal, 1, 0, 3, 0, 0, the coxal spine minute; armed with two claws. Ventral spines of penultimate legs, 0, 1, 3, 2, 1; dorsal, 0, 0, 3, 1, 0; claws 3. None of the posterior coxæ laterally armed. Dorsal spines of thirteenth legs, 0, 0, 3, 2, 2. Ventral spines of first legs 0, 0, 0, 0, 0. None of anterior legs with third joint ventrally armed. Coxal pores small, few in number. Length, about 10 mm.

Locality. Oregon: Boyer. One male taken in August, 1933.

The species is unique in the spining of the legs, which readily separates it from *decipiens* and *ineptus*, two Pacific Coast forms likewise having the anal legs bearing two claws.

OABIUS MIMOSUS Chamberlin

Oabius mimosus Chamberlin, 1938, Ann. Mag. Nat. Hist., (11) 2:631.

Claws of female gonopods tripartite, the lobes short; basal spines 2 + 2, the inner spine of each pair smaller. Third joint of all legs armed both dorsally and ventrally. Ventral spines of anal legs 0, 1, 3, 2, 0, dorsal spines 1, 0, 3, 1, 0; claw single. Ventral spines of penultimate legs 0, 1, 3, 3, 1; dorsal, 1, 0, 3, 1, 1; a minute accessory claw present. Dorsal spines of thirteenth legs, 1, 0, 3, 1, 1. Last two pairs of coxæ laterally armed. Ventral spines of first legs 0, 0, 1, 2, 1. Prosternal teeth 2 + 2, small and pale, equal, the median incision narrowly and acutely V-shaped. Single ocellus and first of seriate ocelli much the largest, the latter few, in two series. Antennæ short, composed of the usual twenty articles. Length, 8 mm.

Locality. Oregon: Boyer. Collected by Prof. J. A. Macnab in July, 1937.

This description is given here because most of the description in the place of first publication was inadvertently dropped out in the course of publication.

Pokabius pedus Chamberlin, sp. nov.

Yellow throughout. Antennæ moderate, composed of twenty articles. Ocelli 1 + 5, 5, the single ocellus larger, the others small and loosely arranged. Prosternal teeth very small, 2 + 2. Coxal pores small, circular, few. None of the dorsal plates with posterior angles produced. Last three pairs of coxæ dorsally armed, but spine of thirteenth pair minute; none armed laterally. Ventral spines of anal legs, 0, 1, 3, 2, 0; dorsal, 1, 0, 3, 1, 0; claw single. Ventral spines of penultimate legs, 0, 1, 3, 3, 1; dorsal, 1, 0, 3, 1, 1;

a minute accessory claw present. Ventral spines of first legs, 0, 0, 0, 2, 1. In the anal legs of the male the fourth joint modified much as in *nankus*, being extended at proximal end above into a conspicuous subconical process channeled down its ectodorsal side, the channel continuing as a longitudinal furrow on the joint; third joint not produced at distal end. Length, about 11 mm.

Locality. Utah: St. George. One male taken March 4, 1928, by A. M. Woodbury.

In the form of the process of the fourth joint of the anal legs of male, as well as in having none of the posterior coxæ laterally armed, resembling *disantus*; but in the latter there is a conspicuous dorsal lobe on the third joint that is lacking in *pedus*.

Lophobius sororis Chamberlin, sp. nov.

Color yellow throughout, the head and posterior segments sometimes darker, more orange. Antennæ short, articles twenty to twenty-two. Ocelli in a narrowly elliptic patch; the single ocellus moderately enlarged, contiguous with patch; usually about fourteen or fifteen in number, *e.g.*, 1 + 5, 5, 3. Prosternal teeth very small and pale, 2 + 2; the special seta on margin ectad of outer tooth on each side; median sinus narrowly V-shaped. Coxal pores small, round, uniseriate, *e.g.*, 2, 3, 3, 3. Ventral spines of anal legs, 0, 1, 3, 2, 0, or occasionally 0, 1, 3, 2, 1; dorsal spines, 1, 0, 3, 0, 0 (male) or 1, 0, 3, 1, 0 (female); claw single. Ventral spines of penultimate legs, 0, 1, 3, 3, 2; dorsal, 1, 0, 3, 1, 1; claw with small accessory claw on posterior side and a spine on anterior side. Dorsal spines of twelfth legs, 1, 0, 3, 1, 1. Ventral spines of twelfth and thirteenth legs, 0, 0, 2, 3, 2. Last five pairs of coxæ dorsally armed, last pair alone laterally armed. Dorsal spines of first legs, 0, 0, 3, 2, 2; ventral, 0, 0, 2(1), 3, 2. Claw of female gonopods tripartite, the lobes short. Basal spines 2 + 2, the spines subcylindrical with obliquely acute apex. Length, 9-10 mm.

Locality. Nevada: Ruby Valley. Numerous specimens under leaves on ground under growth of willow, June 15, 1935, R. V. Chamberlin, collector.

Resembling *collium* of the Salt Lake Valley, etc., but a smaller form differing in spining of legs, as indicated in the key, as well as in the form of the fourth joint of the anal legs of the male. It may be placed with reference to the previously known species by means of the key given below.

Lophobius apachus Chamberlin, sp. nov.

Light brown, the head and antennæ and the caudal end with last legs brighter yellow or orange. Lateral margins of head smooth, without breaks. Antennæ composed of twenty or twenty-one articles which are moderate or short in length. Ocelli 1 + 4, 5, 4, 2, in a narrowly elliptic patch; the single ocellus enlarged, contiguous with the patch. Prosternal teeth 2 + 2; median sinus large and V-shaped; ectal seta in the usual outer position, of ordinary form. None of dorsal plates with posterior angles produced. Ventral spines of anal legs, 0, 1, 3, 2, 1; dorsal, 1, 0, 3, 1, 0; claw single. Ventral spines of penultimate legs, 0, 1, 3, 3, 2; dorsal, 1, 0, 3, 1, 1; claw single. Last four pairs of coxæ dorsally armed, the anal pair alone laterally armed. Ventral spines of first legs, 0, 0, 2, 3, 2; dorsal, 0, 0, 3, 2, 2. Coxal pores small, round, 3, 3, 3, 3 (or 2). Anal legs of male rather slender, the fourth joint not swollen, but with a shallow longitudinal furrow above, the fifth joint also flattened or weakly longitudinally furrowed above; none of the joints lobate. Length, 15 mm.

Locality. Arizona: Duncan, September 5, 1939. Three males of which two are not fully grown.

This species is unquestionably close to *L. arizonæ* Chamberlin, described from Tucson, Arizona. It would seem to be sufficiently distinct in having the claw of the penultimate legs single, whereas in *arizonæ* there are two small but distinct accessory claws; also in having the dorsal spines of the first legs 0, 0, 3, 2, 2 instead of 0, 0, 2, 2, 2.

The following key will aid in separating the species now referred to *Lophobius*.

KEY TO SPECIES OF *LOPHOBIUS*

- 1 (24) All anterior legs, or all but first one or two pairs, with third joint bearing two ventral spines.
- 2 (23) Ventral spines of penultimate legs, 0, 1, 3, 3, 2.
- 3 (6) Anal legs armed with two claws.
- 4 (5) Ventral spines of anal legs 1, 3, 3, 1(0); ocelli in two series *lasalanus* Chamberlin
- 5 (4) Ventral spines of anal legs 1, 3, 2, 1; ocelli in from three to five series *socius* (Chamberlin)
- 6 (3) Anal legs with claw single.
- 7 (16) Dorsal spines of twelfth legs 1, 0, 3, 1, 1 or 0, 0, 3, 1, 1.
- 8 (13) Ventral spines of anal legs normally 0, 1, 3, 2, 0.
- 9 (12) Ventral spines of twelfth and thirteenth pairs of legs 0, 0, 3, 3, 2.

- 10 (11) Last three (or two) pairs of coxæ laterally armed.....
collium Chamberlin
- 11 (10) Only the last pair of coxæ laterally armed.....
loganus Chamberlin
- 12 (9) Ventral spines of twelfth and thirteenth pairs of legs
 0, 0, 2, 3, 2.....*sororis*, sp. nov.
- 13 (8) Ventral spines of anal legs normally 0, 1, 3, 2, 1.
- 14 (15) Last article of anal legs furrowed along mesal side;
 fourth joint in male with a conspicuous dorsal lobe at distal
 end*franciscæ* Chamberlin
- 15 (14) Anal legs not thus modified.....*pungonius* Chamberlin
- 16 (7) Dorsal spines of twelfth legs 1, 0, 3, 2, 2 or 1, 0, 3, 1, 2.
- 17 (20) Ventral spines of anal legs 0, 1, 3, 2, 1.
- 18 (19) Penultimate legs with claw single.....*apachus*, sp. nov.
- 19 (18) Penultimate legs with three claws.....*arizonæ* Chamberlin
- 20 (17) Ventral spines of anal legs normally 1, 3, 2, 0.
- 21 (22) Trochanter of thirteenth legs armed; last two pairs of
 coxæ laterally armed (spine rarely absent from penult.);
 fourth joint of anal legs of male only weakly elevated at distal
 end above.....*helenæ* Chamberlin
- 22 (21) Trochanter of thirteenth legs without spine; only last
 coxæ armed; fourth joint of anal legs elevated into a conspicu-
 ous process at distal end above.....*stenenus* Chamberlin
- 23 (2) Ventral spines of penultimate legs 0, 1, 3, 3, 1 (lobe at
 distal end of fourth joint of anal legs of male conspicuous)
*castellopes* (Chamberlin)
- 24 (1) First seven pairs of legs with the third joint bearing a
 single ventral spine.....*eremus* Chamberlin

Gosibius ameles Chamberlin, sp. nov.

Dorsum, head and antennæ brown, in part of chestnut shade. Legs yellow, the posterior pairs darker. Antennæ of moderate length, distally filiform, composed typically of about thirty segments. Ocelli 1 + 4, 2, 2, the single ocellus a little enlarged, ocelli of bottom row very small. Prosternal teeth 2 + 2, small, the special seta hair-like. Posterior angles of ninth, eleventh and thirteenth dorsal plates produced. Coxal pores small, round, 3, 4, 4, 4. Only the anal coxæ armed laterally and dorsally. Ventral spines of anal legs, 1, 3, 3, 1; dorsal, 1, 0, 3, 2, 0; claws 2. Ventral spines of penultimate legs, 0, 0, 3, 3, 2; dorsal, 0, 0, 3, 2, 2. Ventral spines of first legs, 0, 0, 1, 2, 1. Claw of female gonopods long, strictly entire. Basal spines 2 + 2. Length, 12 mm.

Locality. Utah: near Verdure. Two females taken April 18, 1928, by R. V. Chamberlin.

Of the known species *ameles* is apparently nearest to the Californian *G. monicus*, but is a smaller form differing in having only the coxæ of the last legs armed dorsally and laterally; in having the dorsal spines of the anal legs 1, 0, 3, 2, 0 instead of 1, 0, 3, 2, 2, etc.

Sepedonophilus hodites Chamberlin, sp. nov.

Yellow throughout excepting the claws of the prehensors which are dark brown or in part blackish. Cephalic plate much longer than broad, somewhat narrower behind than in front, the corners rounded and the lateral margins weakly arcuate. No frontal suture. Cephalic plate widely overlapping the basal plate, which is also overlapped by the tergite, the exposed portion being therefore very short. A small circular clypeal area far forward contrasting sharply by its clearness or lack of color from the surrounding region, its polygonal areas smaller and less clearly defined. In a transverse line on a level with caudal end of this area are two stout setæ on each side of middle. Side pieces of labrum well separated by the median piece. Maxillæ I without external lappets. Inner angle of coxa of second maxillæ not especially produced. Claws of prehensors when closed extending much beyond the front margin of the head. Anterior margin of prosternum with the usual two short, conical processes or teeth. Inner side of prehensors bearing a minute tooth below trochanteral suture, a larger one at distal end of femuroid, and one at base of claw joint which is largest of all, conical and acute. Tergite of first pediferous segment bisulcate but the sulci less sharply impressed than on the second and succeeding tergites. First spiracle large, vertically elliptic, larger than the second which is circular and intermediate in size. Last ventral plate very wide, strongly converging caudad; the sides convex, the caudal margins weakly convex. Coxæ of last legs each with a single, relatively large pore opening beneath the ventral plate and a few much smaller ones. Anal legs of male inflated, ending in slender claws. Pairs of legs, forty-nine. Length, about 18 mm.

Locality. Australia. One male taken by quarantine inspector at Honolulu, June 25, 1938, in soil about *Cymbidium lowianum*.

Distinguished from other known species by the number of pairs of legs, the character of the coxal pores, details of the mouthparts, etc.

Gospina Chamberlin, gen. nov.

Resembling *Sogona* in general characteristics but differing in having only a single pit on each anal coxa as in *Timpina*.

Genotype: *Gospina bexara*, sp. nov.

Gospina may be placed with reference to the other known genera of the family by means of the following key:

KEY TO THE GENERA OF SOGONIDÆ

- 1 (4) Coxæ of anal legs with a single pit on each side.
- 2 (3) Tarsus of anal legs consisting of a single joint; prebasal plate not exposed.....*Timpina* Chamberlin
- 3 (2) Tarsus of anal legs two-jointed; prebasal plate exposed.
.....*Gospina*, gen. nov.
- 4 (1) Coxæ of anal legs with two pits on each side.
- 5 (6) Anal legs ending in a claw.....*Garrina* Chamberlin
- 6 (5) Anal legs without claw.....*Sogona* Chamberlin

Gospina bexara Chamberlin, sp. nov.

Cephalic plate longer than wide, narrowed in front of middle; frontal suture not evident; with a distinct median longitudinal sulcus. Prebasal plate narrowly exposed at the middle, the basal plate broad and long. Antennæ distally filiform, moderately compressed proximad of middle. Claws of prehensors when closed scarcely attaining front margin of head. All joints of prehensors short, not armed within. Chitinous lines fine but complete. Spiracles small, circular, very gradually decreasing in size from the first caudad. Tergites bisulcate. Last dorsal plate broad, shield-shaped. Ventral pores fine, in a narrow transverse band running across sternite just behind middle as in *Sogona minima*, the poriferous area not depressed or sharply limited. Last ventral plate very wide; sides convex and converging caudad; caudal margin straight. Coxal pits large, one on each side, this covered by last plate which is slightly emarginate opposite it as in *Timpina texana*. Anal legs in male moderately swollen, with the last article abruptly reduced in diameter and ending in a slight terminal, setigerous lobe in place of a claw; seven articles inclusive of coxa. Pairs of legs, sixty-three. Length of male holotype, about 18 mm.

Locality. Texas: Bexar County, November 9, 1936. One male received from the U. S. Bureau of Entomology and Plant Quarantine.

A NEW PERGANDEIDA FROM THE COLORADO DESERT

(Homoptera, Aphididæ)

BY R. C. DICKSON

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This species was collected on *Suaeda suffretescens* Wats., about one mile east of Indio, California, on March 26, 1939. It proved so interesting when mounted, that a trip was made to the same place two weeks later, but only one additional specimen was taken.

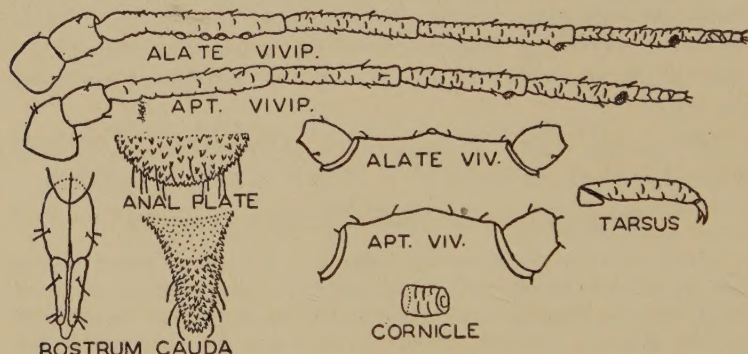
The author desires to express his appreciation for the help received from E. O. Essig, M. A. Palmer and G. F. Knowlton.

Pergandeida cahuilla Dickson, new species

Alate Viviparous Female. Color not closely observed before mounting, dull green with head, thorax, femora, tips of tibiae, tarsi, and anal plate dark. Body aphid-like in shape, length 1.25 to 1.53 mm. to base of cauda. Head without frontal tubercles, width across eyes 0.28 to 0.32 mm., ocular tubercles present. Antennae about one-half body length; III, 0.15 to 0.21 mm.; IV, 0.11 to 0.14 mm.; V, 0.13 to 0.22 mm.; VI, 0.09 to 0.13 + 0.05 to 0.06 mm.; total 0.65 to 0.79 mm. Primary sensoria present on V and VI, margins ciliate, that on VI with 4 to 6 auxilliary sensory pits near it. Secondary sensoria large, circular, causing a slight enlargement of that part of the segment on which they are situated; 4 or 5 in an irregular row on the distal two-thirds of segment III, absent from other segments. Hind tibiae, 0.58 to 0.71 mm.; hind tarsi, 0.09 to 0.12 mm. Cornicles small, cylindrical, with a slight constriction just before the tip, 0.03 to 0.04 mm. in length; cauda conical with 3 or 4 hairs on each side, hard portion 0.09 to 0.11 mm. long; anal plate circular, entire, armed with about 16 setae. Rostrum slenderly obtuse, reaching third coxae, segment IV + V, 0.08 to 0.09 mm. Wings hyaline, venation normal, fore wing with media twice-branched, the second fork two-thirds to three-fourths of distance from first fork to wing edge, length 1.69 to 1.88 mm.; hind wings with media and cubitus present. Prothoracic tubercles present; lateral tubercles on abdominal segments 1 to 7 inclusive. All setae on body and antennae small and inconspicuous.

Apterous Viviparous Female. Color not closely observed before mounting, dull dark green approximating the color of the host leaves. Body length 1.22 to 1.36 mm. to base of cauda; width across eyes 0.31 to 0.34 mm.; ocular tubercles present. Antennae usually slightly less than one-half body length; III, 0.13 to 0.17 mm.; IV, 0.09 to 0.13 mm.; V, 0.10 to 0.13 mm.; VI, 0.09 to 0.10 + 0.04 to 0.05 mm.; total, 0.58 to 0.68 mm.; secondary sensoria absent.

Hind tibiae, 0.52 to 0.65 mm.; hind tarsi, 0.09 to 0.12 mm. Cornicles cylindrical, slightly constricted just before tip, forming a weak flange, 0.03 to 0.05 mm. in length. Rostrum slenderly obtuse, segment IV + V, 0.08 to 0.09 mm. long. Cauda conical, with 3 (or occasionally 4) hairs on each side, length of hard portion, 0.08 to 0.09 mm.; anal plate circular, armed with about 16 setae; prothoracic and lateral abdominal tubercles as in alate form.



Descriptions are from eight alate and seventeen apterous viviparous females mounted on eight slides. A single alate viviparous female has been designated as type and is deposited with the California Academy of Sciences in San Francisco. The remainder of the specimens are designated as paratypes and are distributed as follows: one slide each in the collections of E. O. Essig, G. F. Knowlton and M. A. Palmer, and four in the author's collection.

It was suspected that this might be *Longicaudus suædæ* Mimeur* imported from north Africa on *Suæda* with rooted date palms, so a slide of the California species was sent to Professor Palmer, who compared it with a slide of Mimeur's species in her collection. This comparison and a study of Mimeur's description show that the alate viviparæ of the California species differ from those of the African species in having shorter and more cylindrical cornicles, a smaller cauda, shorter antennæ in proportion to body lengths, segments III and VI shorter and segments IV and V longer in proportion to total antennal length; filament one-half base of VI rather than more than one-half; and in having four or five sensoria on III rather than five to eight. *Longicaudus* is considered by some authors to be a synonym of *Pergandeida*.

*Mimeur, J. M., 1934. Aphididæ du Maroc (Troisième Note). Mémoires de la Société des Sciences Naturelles du Maroc. No. XL, 19-22.

THE DIPTEROUS GENUS MICROPHORUS. II. TAXONOMY

(Diptera, Empididæ)

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(Continued from page 11)

The following identification tables deal with the known Nearctic species of *Microphorus*. Because the tables contain the more important diagnostic characters, the accompanying descriptions of the species have been abridged to include only characters supplementary to the tables.

TABLE OF THE NORTH AMERICAN SPECIES OF MICROPHORUS

MALES

1. Middle trochanters with one or two strong spine-like bristles or spikes; acrostichals biseriate, dorsocentrals uniserial; upper facets distinctly larger than lower ones.....2
- . Middle trochanters and femora not armed beneath with long stiff bristles or spines.....7
2. Hind metatarsi not notched, longer than the two following joints 3
- . Hind metatarsi shorter than the two following joints together and deeply notched below (fig. 17); abdominal hairs pale; third, fourth and fifth ventrals each with paired stiff bristles; arista as long as antenna.....*strigilifer*, sp. n.
3. Hind tibiæ clavate, hind metatarsi much swollen; middle trochanters with stiff double bristle; front femora not bearded; arista about twice as long as third antennal joint.....4
- . Hind tibiæ not clavate and not strongly pectinate, hind metatarsi not swollen; arista relatively shorter.....5
4. Fourth and fifth ventral segments with preapical spines; halteres brown; wings subhyaline.....*robustus* Melander
- . Only fifth ventral segment with preapical spines; halteres black; wings dark.....*armipes* Melander
5. Middle femora with three long strong bristles beneath near the middle; middle tibiæ with a strong flexor swelling or callus just beyond the middle; middle trochanters with one or two stout curved spinous bristles.....6
- . Middle femora not spinose; middle tibiæ without callus; middle trochanters with two slender curved bristles; third antennal joint strongly constricted beyond base, shorter than arista (fig. 8); fifth ventral with only two minute bristles near each side; wings normal.....*sycophantor* Melander

6. Third antennal joint subconical, nearly as long as arista (fig. 4); fifth ventral with a preapical group of three stout setae near each side; wings normal; front femora not bearded
.....*ravidus* Coquillett
- Third antennal joint strongly constricted beyond base, shorter than arista (fig. 7); fifth ventral apically with a large patch of stiff bristles; wings with anal angle lobed, intercalary vein strongly arched before the posterior crossvein, the wing widened at the tip of the intercalary vein, ultimate section of fifth vein much curved, the wing narrowed at its ending; front femora with an up-curved fringe of hairs along the outer side. (See fig. 18).....*cirripes*, sp. n.
7. Fourth ventral segment expanded laterally into a lobe which bears spinous bristles (figs. 14, 16); pygidium large; third antennal joint constricted, style long; facets all moderately small, the upper ones not much larger than the lower; halteres pale.....8
- Ventral segments not lobate; pygidium small or moderate; upper facets distinctly larger than the lower ones.....9
8. Sections of fifth vein subequal; hairs of tibiae not scopiform; lobe of fourth ventral without spatulate process (fig. 16)
.....*isommatius* Melander
- Penultimate section of fifth vein longer than ultimate; hairs of hind tibiae rather coarse and dense; lobe of fourth ventral with long spatulate process (fig. 14).....*evisceratus*, sp. n.
9. Third antennal joint conical, much longer than style (fig. 2); acrostichals in four rows, dorsocentrals irregular and short, six scutellars; abdominal hairs sparse and long; hind tibiae clavate, hind metatarsi swollen; wings hyaline, veins thin; proboscis porrect and sharp.....10
- Third antennal joint much constricted just beyond base; hind legs not enlarged; wings somewhat infumated; proboscis retracted and fleshy.....11
10. Thorax with a shining vitta between the acrostichal and dorsocentral hairs; halteres pale.....*bilineatus* Melander
- Thorax opaque black, at most a grayish vitta indicated between the acrostichal and dorsocentral hairs; halteres black
.....*obscurus* Coquillett
11. Third antennal joint longer than arista, constricted near base, the distal three-fourths almost strap-shaped (fig. 11); occiput densely hairy; four loose rows of acrostichals; discal cell long, the last section of fourth vein shorter than preceding.....
-*discalis*, sp. n.
- Third antennal joint shorter than arista, the distal half constricted (figs 7, 9); occiput moderately hairy; two rows of acrostichals; discal cell ending before tip of first vein, the last section of fourth vein longer than preceding.....12

12. Halteres black; dorsocentrals irregular; abdominal hairs longer than segments; seventh tergite small and pollinose like other segments; third vein nearly straight.....*atratus* Coquillett
- Halteres pale; dorsocentrals regular, uniseriate, five to seven in number; abdominal hairs short, about as long as segments; seventh tergite large and shining; third vein sinuous.....*tacomæ*, sp. n.

FEMALES

1. Third antennal joint distinctly longer than the style; acrostichals in more than two rows.....2
- Third antennal joint equal to or shorter than the arista; acrostichals in two rows.....4
2. Third antennal joint evenly conical (figs. 1, 2); acrostichals numerous; wings hyaline, the sections of the fifth vein equal...3
- Third antennal joint elongate, strongly constricted beyond base, the distal portion almost strap-like (fig. 11); acrostichals loose and irregular; wings lightly infumated, the discal cell large.....*discalis*, sp. n.
3. Thorax with two gray stripes between the small acrostichals and dorsocentrals; halteres pale.....*bilineatus* Melander
- Body and halteres black.....*obscurus* Coquillett
4. Discal cell apically with parallel sides, the oblique vein proximally strongly curved, sections of fifth vein equal; two scutellar bristles.....*cirripes*, sp. n.
- Discal cell tapering before its apical crossvein, the oblique vein nearly straight or gently curved.....5
5. Halteres piceous; notum subshining black, the sparse pollen brown.....*armipes* Melander
- Halteres pale; thorax more or less grayish pollinose and not at all shining.....6
6. Head, thorax and abdomen entirely and densely light gray pollinose; wings hyaline, stigma distinct; four or five strong acrostichals.....*ravus*, sp. n.
- Body appearing more or less blackish.....7
7. Sections of fifth vein equal or subequal; proboscis not or but little projecting; five to seven dorsocentrals in a regular row.8
- Last section of fifth vein shorter than preceding; proboscis usually somewhat projecting.....10
8. About seven pairs of acrostichals, about seven dorsocentrals; veins pale fuscous.....*isommatus* Melander
- About five pairs of acrostichals, about six dorsocentrals; veins piceous.....9

9. Stigma much shorter than intercalary vein; pollen of body grayish.....*sycophantor* Melander
- Stigma about as long as intercalary vein; pollen brownish. (Female unknown, but probably located here).....*robustus* Melander
10. About ten or more dorsocentrals in an irregular row, about nine or ten acrostichals in each row, usually six scutellars.....*atratus* Coquillett
- Five or six dorsocentrals in a regular row, about eight acrostichals in each row, or less, two or four scutellars.....11
11. Third antennal joint distinctly constricted; stigma faintly brown; about eight acrostichals.....*tacomæ*, sp. n.
- Third antennal joint subconical; stigma absent; about four acrostichals.....12
12. Vertex and upper occiput shining or subshining.....*ravidus* Coquillett
- Vertex and upper occiput opaque pollinose.....*strigilifer*, sp. n.

1. MICROPHORUS ARMIPES Melander

Melander, 1927. Genera Insectorum, fasc. 185, p. 91.

Length 2.5 mm. Third joint of antennæ strongly constricted, half as long as arista (fig. 10); about ten dorsocentrals, eight acrostichals, four strong scutellars; abdominal hairs longer than the segments; fifth ventral with two long apical bristles on each side; pygidium small, the keel with six strong apical bristles; penis split, the upper fork slender, the lower hooked; middle femora with two strong bristles beneath near middle; hind metatarsi two-thirds as long as their tibiæ; stigma distinct, three times as long as wide; sections of fourth vein proportioned 1:2:3, sections of fifth vein equal.

Types: Seattle, Olga and Quilcene, Washington, in Melander collection. Fourteen males and ten females, all from Western Washington and Oregon, late June and July. Washington: Blewett Pass, Granite Falls, Index, Lilliwaup Falls, Mount Constitution, Pluvius, Vancouver. Oregon: Aurora, Corvallis, Mount Hood, Summit, Benton County (H. A. Scullen). All but the last collected by the author.

2. MICROPHORUS ATRATUS Coquillett

Coquillett, 1900. Proc. Wash. Acad. Sci. ii, p. 412.

Melander, 1902. Trans. Amer. Ent. Soc. xxviii, p. 333 (*Holoclera*).

Coquillett, 1903. Proc. Ent. Soc. Wash. v, p. 263 (*Anthalia*).

Proctor, 1938. Biol. Surv. Mt. Desert Reg. vi, p. 321 (occ. in Maine).

Length 2.5 mm. Upper facets coarse; third antennal joint short, two-thirds as long as arista (fig. 9); proboscis projecting nearly half the head-height; more than twelve dorsocentrals in more than one linear row, acrostichals irregular, about nine pairs, six scutellars; seventh abdominal segment small, pollinose like rest of the segments, no peg-like hairs on sternites; pygidium small, penis ending in two long reflexed closely approximating needle-like prongs; abdominal hairs conspicuous; hind metatarsi slightly shorter than remainder of tarsus; posterior crossvein nearly half as long as oblique crossvein, sections of fourth vein 1:3:4, sections of fifth vein nearly 2:1, second posterior cell wider than third at margin.

Type, Kodiak, Alaska, in the United States National Museum. A western species, especially abundant on Mount Rainier; 115 males and 56 females mounted, collected by the writer, July and August, in the following localities, except as noted. Alaska: Douglas (Eldred Jenne). Idaho: Coeur d'Alene Lake. Washington: Big Four Mountain, Nasel; and the following stations on Mount Rainier, Alta Vista, Berkeley Park, Chinook Pass, Fairfax Trail, Hanson Creek, Indian Henry Park, Mazama Ridge, Paradise Park, Sluiskin Falls, Summerland, Van Trump Park, Yakima Park. C. W. Johnson identified the species as occurring in Maine.

3. MICROPHORUS BILINEATUS Melander

Melander, 1902. Trans. Amer. Ent. Soc. xxviii, p. 334, fig 99 (*Holoclera*).

Coquillett, 1903. Proc. Ent. Soc. Wash. v, p. 263.

Length 2 mm. Upper facets moderate; proboscis slender, without fleshy labella, palpi slender; thorax cinereous black; scutellum cinereous, dorsocentrals in more than single row; pygidium small; legs piceous, hind metatarsi one-third as long as tibia; stigma weak, three-fourths as long as intercalary vein; sections of fourth vein 1:5:6, of fifth vein equal.

Cotypes, Opelousas, Louisiana, in American Museum of Natural History and Melander collection.

4. *Microphorus cirripes* Melander, sp. nov. (Fig. 18)

Length 3 mm. Third antennal joint two-thirds as long as arista, the apical portion narrow (fig. 7); proboscis not projecting; dorsum thickly brownish-gray pollinose, seven irregular dorsocentrals, about three pairs of acrostichals, four scutellars, the lateral ones minute; vestiture of abdomen inconspicuous, the hairs not longer than segments, only fifth ventral setose; pygidium opaque, the penis shining, keel studded with radiating bristles; middle trochanters with stout curved double bristle; fringe of front femora close, consisting of fine brown hairs, those of distal half longer than the width of femur; callus of middle tibiae strong and provided with a row of bristly hairs; stigma faint, about half as long as intercalary vein, posterior crossvein about one-fourth the curved first section of intercalary vein, sections of fourth vein about 1 : 2 : 3, of fifth vein subequal; halteres pale.

Female. Thoracic bristles somewhat stronger than in male, eight dorsocentrals, five sets of acrostichals; wings normal in outline, fifth vein not arched; legs normal, hairs inconspicuous, hind metatarsi slightly shorter than remainder of tarsus; abdomen normal, nearly bare, apex shining.

Holotype and allotype, Eagle Creek, Columbia Highway, Oregon, June 24, 1935, Melander collection. Twenty-eight males and thirty-five females, all western. Washington: Adna, Canyon Creek, Granite Falls, Husum, Lake Cushman, Lilliwaup Falls, Potlach, Quilcene, and Stehekin on Lake Chelan; all late July or early August. Vancouver Island: Goldstream, July 12, 1924. Oregon: Hood River, June 30, 1917; and August 1, 1917 (Leroy Childs). California: Dyerville, June 20, 1935. All except the last Hood River specimen collected by the author.

5. *Microphorus discalis* Melander, sp. nov.

Length 3 mm. Arista equal in length to the constricted part of the third antennal joint which is tapering, strap-like, and longer than in the other species (fig. 11); palpi hairy; dorsum of thorax atrous black, hairs long, pleuræ with slight cinereous tinge, seven coarse uniserial dorsocentrals, eight scutellars; hairs of abdomen conspicuous, as long as segments or longer, no spines or stiff bristles; seventh segment and pygidium very small; legs slender, femoral hairs forming a pecten above and below, hind tibiae with pecten of hairs along exterior face; wings widest at base of discal cell, anal lobe more sharply rectangular than usual, veins firm, blackish, stigma elliptical, fuscous, equal to the intercalary vein, discal cell extending to tip of first vein, sections of fourth vein 1 : 6 : 4, of fifth vein 3 : 2; halteres and alulae black.

Holotype, male, Muir Woods, near San Francisco, California, August 7, 1915; allotype, Dyerville, California, June 20, 1935; paratype, female, Vancouver, Washington, July 7, 1917; all in Melander collection.

This species is related to the European *M. velutinus* Meigen, but is more hairy and has distinctly longer antennæ. *M. velutinus* has the last two sections of the fourth vein nearly equal.

6. *Microphorus evisceratus* Melander, sp. nov.

Length 2.4 mm. Hairs of occiput sparse and short; third joint of antennæ about two-thirds as long as arista (fig. 6); proboscis not projecting; seven uniserial dorsocentrals, about eight sets of acrostichals, four scutellars; third sternite deeply emarginate, with a strong spine at each side, the large lobe of fourth sternite with marginal fringe of coarse hairs (fig. 14), the fifth sternite located between the lobes of the fourth, bilobed and bearing four strong projecting blunt spines of which the middle pair is fused (fig. 15); pygidium ventrally bearing at base a dense cluster of pale hairs setting off the usual two slender downward-projecting valves, penis tipped with a pair of divaricate bristles; vestiture of abdomen fine, not conspicuous; legs normal, hind metatarsi equal to the three following joints together; wings subhyaline, veins piceous, stigma three-fourths as long as intercalary vein; discal cell extending to tip of first vein, posterior crossvein half as long as the oblique crossvein, sections of fourth vein 1 : 2 : 3, of fifth vein 5 : 4, third vein arched; alulæ pale yellow, with pale hairs.

Type, Kendrick, Idaho, June 7, 1917. Two paratypes, one collected with the type, the other at Upper St. Regis River, Montana, July 28, 1918.

7. *MICROPHORUS ISOMMATUS* Melander

Melander, 1927. *Genera Insectorum*, fasc. 185, p. 92.

Length 2 mm. Hairs of occiput short; third joint of antennæ about two-thirds as long as arista (fig. 6); proboscis fleshy, not projecting; seven uniserial dorsocentrals, about five sets of acrostichals; vestiture of abdomen short and sparse, each lobe of fourth ventral with an oblique row of five thorn-like submarginal setæ, lateral to which are two long setæ (fig. 16), penis tipped with two divaricate setæ; legs not ciliate, hind metatarsi only slightly longer than the two following joints together; wings subfuscous, veins thin and fuscous, stigma three-fifths as long as intercalary

vein, posterior crossvein one-third the oblique crossvein, sections of fourth vein 2 : 5 : 7, of fifth vein equal, third vein arched.

Types from London Hill Mine, Bear Lake, British Columbia, the holotype in the United States National Museum, paratype in the Melander collection. I have taken a male on Mount Rainier, Paradise Valley, August, 1917.

8. MICROPHORUS OBSCURUS Coquillett

Coquillett, 1903. Proc. Ent. Soc. Wash. v, p. 268.

Length 2 mm. Upper facets coarse; third antennal joint usually more than twice as long as deep (fig. 2), sometimes slightly under (fig. 1), the style one-half the length of the third joint or less; proboscis slender, without fleshy labella, palpi slender; notum and tergum of male velvety black, of female cinereous black; dorso-centrals and acrostichals small, about ten to the row, dorsocentrals in more than a single row, especially noticeable in female; pygidium small; hind metatarsi about one-third as long as tibia; veins thin, stigma two-thirds as long as intercalary vein, sections of fourth vein 1 : 4 : 6, of fifth vein equal.

Very close to the European *M. anomalus* Meigen, which however is somewhat larger, measuring 2.5 mm., and the male has all the hairs of the sternites equally long. *M. obscurus* has only the preapical hairs of the sternites conspicuous in the male.

Type from Franconia, New Hampshire, in the United States National Museum. The species is generally distributed along the Atlantic seaboard from June to early August. I have thirty-six males and fifty-one females before me, all but two collected by myself, representing the following localities. Connecticut: Redding, Woodbury. Massachusetts: Chester (C. W. Johnson). Vermont: Lynden. New Hampshire: Benton. New York: Cold Spring Harbor, Bear Mountain, Tuxedo. Virginia: Fairfax County (R. C. Shannon, May). Five additional females from Troy and Kendrick, Idaho, June, and Almota, Wawawai and Yakima, Washington, May, are indistinguishable from the eastern females of *obscurus*. Unfortunately no associated males were captured, so it cannot be stated with certainty whether these western females are *obscurus*, *anomalus*, or a new species.

9. *MICROPHORUS RAVIDUS* Coquillett

Coquillett, 1895. Proc. U. S. Nat. Mus. xviii, p. 409.

Melander, 1902. Trans. Amer. Ent. Soc. xxviii, p. 333 (*Holoclera*).

Coquillett, 1903. Proc. Ent. Soc. Wash. v, p. 263.

Length 2.4 mm. Third antennal joint less constricted than usual, twice as long as deep and subequal to arista in length (fig. 4); proboscis obliquely projecting, with fleshy labella; dorsum dull brownish pollinose, about six dorsocentrals, four sets of scattered acrostichals, four scutellars; fifth ventral segment with two or three claw-like spines on each side; vestiture of abdomen rather sparse, the hairs about as long as segments; the two stiff bristles of middle trochanters of male usually fused; discal cell ending distinctly before tip of first vein, blunt, the posterior crossvein three-fourths as long as the oblique vein behind it, sections of fourth vein 1 : 3 : 4, of fifth vein equal, third vein with anterior curvature, no stigma; halteres pale.

Type: Los Angeles County, California, in the United States National Museum. Coquillett's cotype series contained also the species here described as *ravus*. I have nine specimens, all from California, late March to early June, adding the following localities: Lake Elsinore, Pinehurst, Riverside, and Alpine, the last collected by the late M. C. VanDuzee.

10. *Microphorus ravus* Melander, sp. nov.

Female, length 2.3 mm. Third joint of antennæ equal in length to arista, slightly constricted at middle, not much longer than deep (fig. 3); proboscis not projecting, fleshy; seven dorsocentrals, about six sets of acrostichals, four scutellars, the lateral small, one subhumeral; only last segment of abdomen somewhat shining, abdominal hairs sparse, short and black; legs normal, not ciliate, hind metatarsi equal to the two following joints; wings hyaline, veins piceous, stigma half as long as intercalary vein, discal cell ending just before tip of first vein, posterior crossvein half as long as oblique crossvein, sections of fourth vein 1 : 3 : 4, of fifth vein 5 : 4; alulæ pale, with pale hairs.

Type, Los Angeles County, California, March, collected by D. W. Coquillett and identified by him as his species *ravidus*. I have taken the species at Mount Vernon, Washington, July 3, 1924, and have received it from Blue Lake, Humboldt County, California, June 20, collected by J. Chester Bradley for Cornell University.

11. *MICROPHORUS ROBUSTUS* Melander

Melander, 1927. Genera Insectorum, fasc. 185, p. 91.

Length 3 mm. Proboscis not projecting, fleshy; seven or eight short dorsocentrals, five acrostichals, four scutellars; vestiture of abdomen mostly shorter than segments, fourth and fifth ventrals each with a single preapical peg-like spine toward each side; penis split, the two forks slender, the lower unciform; middle femora with five or six bristles along middle part beneath, hind metatarsi two-fifths as long as tibia; stigma four times as long as wide, sections of fourth vein 1 : 3 : 4, of fifth vein 7 : 6, or equal.

Only the type series known, all males, Swarthmore, Pennsylvania, June, collected by E. T. Cresson, Jr. Holotype in the Academy of Natural Sciences of Philadelphia. A female from Atherton, Missouri, June 2, 1901, received from Dr. C. F. Adams, may prove to be this species, although more probably it represents an undescribed southern species. It has six pairs of acrostichals and seven dorsocentrals. The stigma is evanescent. The thorax is more pollinose than that of male *robustus*.

12. *Microphorus strigilifer* Melander, sp. nov.

Length 3 mm. Upper facets moderate; third joint of antennæ three times the basal depth, slightly shorter than arista (fig. 5); dorsum brownish pollinose, with two faint cinereous vittæ, hairs irregular and small, about four or five dorsocentrals in each row, about two sets of acrostichals, four scutellars the lateral very small; vestiture of abdomen fine, not conspicuous, as long as segments, the paired submarginal lateral hairs of ventral segments stiff, those of last three segments spinous; both forks of penis blade-like; middle trochanters with strong double spine; middle femora swollen at basal two-thirds, beneath which are four setæ, another group of three flexor setæ just beyond the middle of femur; middle tibiæ somewhat swollen beneath at middle; hind metatarsi distinctly excavated (fig. 17); wings slightly infumated, widest at third posterior cell, stigma not developed, discal cell blunt, the two apical crossveins nearly equal, third vein with anterior curvature, sections of fourth vein 1 : 3 : 4, of fifth vein 3 : 2; halteres fuscous, the tip darker.

Five males and two females, all collected by P. H. Timberlake and the author on May 25, 1935, at Forest Home, Valley of the Falls, near San Bernardino, California.

13. *MICROPHORUS SYCOPHANTOR* Melander

Melander, 1902. Trans. Amer. Ent. Soc. xxviii, p. 334 (*Holoclera*).

Coquillett, 1903. Proc. Ent. Soc. Wash. v, p. 263 (*Anthalia*).

Length 2.4 mm. Third joint of antennæ three-fourths as long as arista (fig. 8); proboscis short, obliquely projecting, with fleshy labella; five to seven uniserial dorsocentrals, four pairs of acrostichals, four scutellars, hairs of thorax long; fifth sternite with two bristly hairs on each side, keel of pygidium margined with a dozen radiating hairs; middle trochanters with two curved bristles; stigma narrow, two-thirds as long as intercalary vein, sections of fourth vein 1 : 2 : 3, of fifth vein subequal; halteres of male usually black, sometimes brown or even yellowish, of female yellow.

Types, Moscow, Idaho, in the American Museum of Natural History and the Melander collection. The species is widely distributed and very common locally and seasonally. I have collected and mounted over one hundred males and forty females, May in the lower valleys, June in the intermediate levels, and July in the uplands. Colorado: Estes Park. Wyoming: Thumb Station, Yellowstone Park. Idaho: Craig Mountain, Kendrick, Lake Waha, Moscow Mountain, Troy, Worley. Washington: Almota, Colfax, Ewan, Kamiac Butte, Holland, Mount Adams, Pullman, Wawawai, Yakima. Oregon: Mount Hood. California: Yosemite. Two additional specimens add to the locality record: Banff, Alberta (C. G. Hewitt) and Crede, Colorado (S. J. Hunter, August).

14. *Microphorus tacomæ* Melander, sp. nov.

Length 2.4 mm. Upper facets only moderate in size; third joint of antennæ short, about three-fifths as long as arista (fig. 7); proboscis not projecting; about five pairs of acrostichals, four scutellars; fifth ventral with eight to ten stiff marginal setæ, seventh tergite twisted to left side of abdomen, pygidium stout, the bulbous base of penis with a single outstanding bristle on each side; hind femora with a row of twenty oblique hairs along lower outer edge, hind tibiæ rather strong, not ciliate; stigma about half as long as intercalary vein, posterior crossvein two-fifths as long as oblique vein, sections of fourth vein 1 : 3 : 4, of fifth vein 6 : 5, sometimes subequal in female.

Type, Indian Henry Park, Mount Rainier, Washington, August 2, 1922. I have taken over one hundred specimens, the sexes evenly represented, at various stations on Mount Rainier, during late July and through August, as follows: Alta Vista, Crystal Mountain, Eagle Peak, Mazama Ridge, Paradise Park, Sluiskin Falls, Squaw Lake, Summerland, Van Trump Park and Yakima Park. I have taken the species also at Stehekin, at the head of Lake Chelan, Washington.

ON THE STATUS AND HOME OF ANTHONOMUS GRACILIPES BOHEMAN

(Coleoptera, Curculionidæ)

BY ELWOOD C. ZIMMERMAN

Bernice P. Bishop Museum, Honolulu, T. H.

The large and widespread genus *Anthonomus* has not penetrated Oceania. However, two species of the genus have been reported as inhabiting Pacific islands. One of these is *Anthonomus gracilipes* Boheman, 1859, recorded from Tahiti; the other is *Anthonomus pumilus* Montrouzier, 1860, from the Loyalty Islands. The first of these species is certainly not a Pacific insect; the second may be a Pacific insect placed in the wrong genus, but I have not seen it and do not know what it is.

Through the courtesy of Dr. A. Roman and the cooperation of the Naturhistoriska Riksmuseum of Stockholm, I have been able to examine a paratype of Boheman's species recorded from Tahiti, and the results of my study follow.

In the report on the "Voyage de L'Eugenie," Boheman described *Anthonomus gracilipes* from "Insula Taiti." When I first saw this record, I considered that the type specimens were either incorrectly labeled or that Boheman had erroneously assigned some Tahitian weevil to *Anthonomus*. An examination of a paratype has shown conclusively that *A. gracilipes* is a typical *Anthonomus*. It is therefore evident that an error was made in recording the locality of the species. Boheman said that *A. gracilipes* was similar to his *A. rubricosus*, which he described on the preceding page, from "Rio Janeiro," Brazil. This clue is perhaps sufficient in itself to show that *A. gracilipes* is a South American insect. However, without additional specimens bearing correct locality data it is not possible to tell to what locality in America the species belongs. It is sufficient to show by this report that *A. gracilipes* is American and not Tahitian. However, together with his descriptions of *A. gracilipes* and *A. rubricosus*, Boheman described a species from Ecuador, one from Uruguay, and one from California. At one of the American collecting points of the cruise, *A. gracilipes* was collected. We should, therefore, transfer *Anthonomus gracilipes* Boheman to the American fauna (I believe South American) and thus remove another ambiguity and misleading record from the Oceanic coleopterous fauna. The species is redescribed below.

ANTHONOMUS GRACILIPES Boheman

Boheman, Eugenies Resa, p. 132, 1859.

Male: derm brownish yellow to reddish brown, the sternum somewhat darker than the elytra, appendages paler; densely clothed with white squamæ.

Head reticulate, bare on the crown near the pronotum, densely clothed elsewhere with elongate, slender, anteriorly directed squamæ borne from small, closely placed punctures; front slightly but distinctly flattened, with a small shallow median fovea on a line between the hind margins of the eyes; interocular area slightly narrower than the base of the rostrum (5:6), densely squamose; eyes as broad as the interocular area and distinctly longer than broad (7:5), distinctly and abruptly protruding from the sides of the head at their hind edges. *Rostrum* gently and evenly arcuate, about as broad as high at the base, slightly expanded from base to apex on the sides (base 5, apex 7), about one and three-quarter times the length of the pronotum; antennæ inserted at about the apical three-eighths, shallowly, subobsoletely sulcate from the base to the insertion of the antennæ, with slender setæ or setiform, prostrate, mostly medially inclined squamæ arising from shallow punctures in the sulci; densely, shallowly, subconfluently punctate, shiny and apparently bare beyond the antennæ. *Antennæ* with the small clavus of the scape hardly reaching past the fore corner of the eye, the clavus bearing a few hairs; scape with segment one about one-fourth longer and about twice as broad near the apex as the apex of two, two three times as long as broad and about one-third longer than three, three about as long as four, four to seven successively slightly shorter and broader, seven about as broad as long; club as long as the preceding five and one-half segments, distinctly four-segmented, the sutures between the segments well marked, the first two segments subequal in length, three about one-third shorter than two, four acutely pointed. *Prothorax* distinctly broader than long (3.1:2.3), broadest near the base; very slightly arcuate on the sides from the base to the middle and thence shallowly, concavely narrowed to the apex, apex truncate, two-thirds as broad as the base, the longitudinal dorsal contour almost evenly convex, but slightly depressed between the middle and the apex; densely and coarsely punctate, the interstices narrower than the punctures and giving a reticulate appearance, their surfaces smooth and shiny, the punctures becoming smaller anteriorly; densely squamose throughout, the squamæ arising from the punctures, narrow, sublanceolate, each two to four times as long as broad, prostrate, directed anteriorly. *Scutellum* strongly convex, distinctly protuberant, about one-fourth longer than broad, densely and finely squamose. *Elytra* about two-thirds as broad as long,

slightly more than three times as long as the prothorax, base only slightly convex on either side of the scutellum, distance across the base one-fourth greater than the base of the prothorax, slightly arcuate on the sides to the broadest part at the apical third, thence broadly rounded to the apex and very slightly or not subapically constricted; longitudinal dorsal contour strongly and evenly convex, rising far above the level of the pronotum and reaching the summit at or slightly before the caudal third; striæ shallow, with shallow punctures bearing microscopical setæ; intervals slightly broader than the striæ, finely alutaceous, shiny; the posterior calli very low and broad, not conspicuous; densely and evenly clothed with squamæ similar to but slightly smaller than those on the pronotum, not arranged in any design. *Legs* with the femora loosely clothed with narrow squamæ, the fore pair armed with a conspicuous, sharp, acute, triangular tooth at about the apical third, the middle pair armed with a small tooth, hind pair with an inconspicuous, minute, subobsolete tooth; tibiæ slender, setose, the fore and middle pair almost straight on the outer side, except for the basal arcuation, sinuous on the inner side, strongly unguiculate, hind pair rather stoutly mucronate; tarsi with the claws bifid, the inner teeth converging, contiguous distally, almost as long as the outer teeth. *Sternum* with the prosternum and coxæ densely squamose, the fore coxæ contiguous, the postcoxal and antecoxal areas equal in length; mesosternum and coxæ densely squamose, the triangular intercoxal process most densely squamose, the mesocoxæ slightly less than one-half as broadly separated as the breadth of a coxa; metasternum finely punctate, densely squamose, evidently somewhat more loosely so toward the median line, as long between the mid and hind coxæ as the length of the first ventrite along the median line, metacoxæ separated about as far as the breadth of a mesocoxa. *Venter* finely and obscurely punctate, coarsely hirsute; intercoxal process of the first ventrite subtruncate; ventrite I shorter than II plus III. *Pygidium* convex, finely punctate, hirsute. Length: 2.25 mm., excluding the head and rostrum; breadth: 1.1 mm.

The paratype at hand bears the labels "Taiti" and "Kinb."

If this were a North American species, it would be placed in the "squamosus" group of the genus. Unfortunately, I do not have access to a collection of South American *Anthonomus* with which to compare this species and cannot, therefore, place it as an ally of any of the South American species or give a synopsis of diagnostic characters whereby it may be distinguished from them.

A NEW TRITOMA FROM LOWER CALIFORNIA

(Hemiptera, Reduviidæ)

BY ROBERT L. USINGER

*University of California, Davis**Tritoma peninsularis* Usinger, new species

Closely allied to the polytypic *protracta* complex but much smaller than *woodi*, the smallest form of that group, and with the head evenly convex above throughout its length, not impressed at base of tylus.

Head twice as long (excluding constricted neck region) as broad across eyes, 23::11½; anteocular portion twice as long as postocular portion to posterior constriction, 13::6½; antenniferous tubercles reaching two-fifths of the distance from eyes to apex of head; tylus narrow anteriorly, broadened well before level of insertion of antennæ and uninterruptedly continuous with vertex, there being no depression at the sides or base of the tylus; surface covered with distinct pits. *Eyes* small, shorter than postocular portion of head, 4½::5, and about one-fourth the width of interocular space. *Antennæ* three-fourths as long as head and pronotum together, 35::47; proportion of segments one to four as 4½:12:9½:9; first segment reaching a little more than half the distance to apex of head. *Rostrum* relatively slender, about half as wide at base of second segment as thickness of front femora; ratio of segments one to three as 8½:12:5½; apex beset with fine, erect bristles. *Pronotum* shorter than head, 21::26; broader than long, 28::21; and less than half as wide at anterior margin as across humeri, 13::28; antero-lateral angles scarcely produced, appearing as rounded lobes; sides feebly carinate and moderately sinuate; disk unarmed, rugose and with scattered small pits, especially on elevated regions. *Scutellum* about half as long as pronotum, 11::21, and broader at base than long, 14::11; disk sloping laterally from two posteriorly converging longitudinal carinæ, transversely rugose; posterior prolongation comprising less than half of the scutellar length, 5::11, broad at base and subacute and downwardly directed at apex. *Hemelytra* and *connexivum* as in *protracta*. *Under surface* smooth and polished, with very minute, scattered, pale hairs; thoracic pleurites transversely rugose; mesosternum with an ill-defined, rugose knob or elevation just behind front coxæ followed by a generally elevated area; metasternum strongly narrowed anteriorly so as to appear subpentagonal in outline, sublaterally feebly compressed on posterior half producing a rounded median longitudinal carina. Abdominal venter rather evenly rounded except for the compressed, subangular first seg-

ment. *Legs* rather short and stout, the front femora slightly more than one-fourth as thick as long, $5\frac{1}{2}:20$; front and middle femora each with four very small, blunt spines subapically beneath, the hind femora inermous. Female genital plates strongly declivous, almost vertical, beset with erect ferrugineous bristles.

Color dark brown, the apical two antennal segments, tarsi and joints of the legs, base along labrum and apex of rostrum, metasternum at least anteriorly and transverse sutures of the connexivum pale, testaceous to fulvous. Eyes silvery black. Ocelli clear white,

Size: male, length 10.9 mm., width (pronotum) 2.54 mm., (connexivum) 3.54 mm.; female, length 11.36 mm., width (pronotum) 2.65 mm., (connexivum) 3.54 mm.

Holotype, male, No. 4973, Mus. Calif. Acad. Sci., Ent., and allotype, female, in my own collection, taken 20 miles northwest of La Paz, Lower California, Mexico, on July 16, 1938, by A. E. Michelbacher and E. S. Ross to whom I am indebted for these interesting specimens.

The closely allied *protracta* differs from *peninsularis* as follows: Head a little more than twice as long (excluding constricted neck region) as broad across the eyes, $34:15$; a slightly arcuate transverse impression at base of tylus; head scarcely longer than pronotum, $35:33$; mesosternal elevation well defined, transversely arcuate, being abruptly depressed and flat on the concave posterior side; metasternum not strongly narrowed anteriorly; first abdominal segment not strongly compressed between hind coxæ, rather evenly rounded; female genital plates deflected downward from the main dorsal axis of the body about 45° ; size (*woodi*) 15-16 mm., (California *protracta*) 17-18 mm., (New Mexico and Colorado *protracta*) 22 mm.

DINEUTUS IN CALIFORNIA

(Coleoptera, Gyrinidæ)

A year or two ago, Mr. J. J. du Bois of Berkeley, California, gave me four specimens of *Dineutus* labelled "Mecca, Cal., VII. 15.34." Unfortunately the collector's name is unknown. The beetles are *Dineutus solitarius* Aubé, described from Mexico. It would be interesting to verify this Californian record by further collecting at Mecca, which is in Riverside County, just north of the Salton Sea.—Hugh B. Leech, Vernon, B. C.

RECORDS OF SOME COLEOPTERA FROM THE SAN JACINTO MOUNTAINS, CALIFORNIA

BY E. G. LINSLEY AND E. S. ROSS

University of California

During the latter part of May and June of 1939, the Division of Entomology of the University of California held a summer field course in the San Jacinto Mountains of southern California. A large number of interesting insects were collected in this area and since many of them were new, they will be described elsewhere. Among the rare or interesting previously described Coleoptera, the following seem worthy of special record:

Cupesidæ. A number of specimens of the rare *Cupes lobiceps* LeConte, the habits of which are apparently unknown, were taken at Piñon Flats in the early evening of May 22 by sweeping miscellaneous low herbage in an open, arid flat.

Melasidæ. More than twenty examples of the striking beetle *Palæoxenus dohrni* (Horn), previously known from but a few, scattered localities, were taken in the vicinity of Idyllwild, mostly under bark of old stumps of *Libocedrus decurrens*. At least one additional specimen was seen flying at dusk.

Buprestidæ. *Acmaeodera latiflava* Fall is generally treated as a variety of *A. hepburni* LeConte. However, in a series of more than 500 examples taken at Piñon Flats there was no indication of intergradation with the LeConte species. The majority of the specimens were taken under very arid conditions at flowers of *Sphaeralcea ambigua*. When the latter ceased to bloom, they were found on *Eriogonum*, *Encelia*, *Yucca*, and *Eriodictyon*. In view of the constancy of *latiflava* and the widely different conditions under which it is found (as compared to *hepburni*) it seems probable that it should be considered as a distinct species. *Pæcilonota bridwelli* Van Dyke, a rare species originally described from Imperial County, California, was taken on flowers in a canyon near Palm Springs. Another buprestid, *Chrysobothris quadrilineata* LeConte, previously known from New Mexico and Arizona, was found on *Juniperus californicus* at Piñon Flats.

Coccinellidæ. A series of the rare, black, *Coccinella prolongata bridwelli* (Nunenmacher) was taken at the type locality (Tahquitz Meadow) in colonies of *Aphis lupini* Gillette and Palmer on a small perennial lupine. Although the host plant of the aphid was very abundant, colonies of the insect were very scarce and were mostly found at or below the ground level. The beetle was found with but a small percentage of the colonies. According to E. O. Essig, who very kindly made the determination, the aphid has not been previously recorded from California. Another rare ladybird, *Hippodamia lunato-maculata lengi* Johnson, was taken in numbers on *Sphæralcea ambigua* at Piñon Flats.

Scarabæidæ. The rather uncommon *Valgus californicus* Horn was found in several localities in the Transition Zone in association with *Zoötermopsis* spp. under bark of *Pinus ponderosa* stumps.

Cerambycidæ. At Palm Springs, *Stenodontes* (*Nothopleurus*) *lobigenis* (Bates) was noticed causing rather severe injury to pepper trees along the streets. The larvæ mined in the heartwood and over a period of years have succeeded in hollowing out a large proportion of the trees. The weakened trees suffer severely from wind damage. Most of the boring is in the basal six feet of the trunk, and adults were found resting in the openings of their emergence holes in June. The flower-loving longicorn, *Anoplodera* (*Judolia*) *instabilis* (Haldeman), was abundant in the higher valleys on lupine, but the individuals represented a black phase similar to that found in the southern Rocky Mountains. Practically all of the males and the majority of the females taken were wholly black, the remainder being much darker than those found in the Sierra Nevadas and farther northward. A related but much rarer species, *Anoplodera* (*Judolia*) *scapularis* Van Dyke was found in large numbers on flowers of *Sphæralcea ambigua* at Piñon Flats. Another rare species, *Molorchus eburneus* Linsley, previously known by single specimens from Yosemite and Lake Tahoe, was found on *Abies concolor* on the Tahquitz Peak Trail.

COCOON-SPINNING THYSANOPTERA

BY STANLEY F. BAILEY

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Among recent findings arising from studies of thrips, there is one of particular interest from the standpoint of the phylogeny of the order Thysanoptera. This fact is the discovery of the cocoon-spinning capacity. Kurdjumov (1913) was the first to report this habit, as observed in the larva of *Æolothrips fasciatus* (L.) in Russia. Secondly, unaware of Kurdjumov's finding, Reijne (1919-20) described the same habit in *Franklinothrips tenuicornis* Hood in Dutch Guiana (Paramaribo). Lastly, Karny (1926) described the same characteristic in an *Anaphothrips* species in Java (Buitenzorg).

In the spring of 1932 at Alhambra, California, the writer reared *Æolothrips kuwanaii* Moulton in the laboratory and discovered that it spins a cocoon for pupation. This observation is the first report of this habit among thrips in North America. Since this first observation, the writer has reared *Æolothrips fasciatus* (L.) and has confirmed Kurdjumov's finding. These two species have spun their cocoons in curled leaves of alfalfa in vials in the laboratory. In both instances the "silk" came from the anal end of the body and the cocoons were formed by the twisting and turning of the abdomen. The cocoons are not uniform in shape, but usually oval. The "silk" itself varies in diameter.

In addition to these species, three others, in two different æolothripid genera have a similar habit, namely, *Orothrips kelloggii* Moulton, *Ankothrips yuccæ* Moulton, and *Ankothrips gracilis* Moulton. All these species secreted the "silk" from the anus* and formed their cocoons in soil in vials in the laboratory. The cocoons have not yet been found in the field as considerable time and patience is necessary to locate them.

*Snodgrass (1938) states "the Malpighian tubules of certain insects are known to produce just before the time of pupation a substance which is spun out of the anus in the form of silk threads, with which the cocoon is woven. This silk-forming function of the larval Malpighian tubules has been described in the neuropterous species *Mermeleon formicarius* and *Chrysopa perla*, in the curculionid *Phytonomus arator*, and in the chalcid *Euplectrus bicolor*." This is apparently the case also in these thrips.

In the spring and early summer in California, æolothripids are very abundant and by midsummer they have largely disappeared. Only occasionally is a specimen of *Æolothrips* collected during the hot, dry period. However at higher elevations they are to be seen during July and August. *Orothrips*, *Ankothrips*, and *Erythrothrips* in California have only one generation a year and, as far as is known to the writer at present, are all plant feeders. In view of the fact that *Æolothrips fasciatus* and *kuwanaii* (both of which are predaceous) are present over a longer period, it would seem probable that they have two generations (Kurdjumov found two generations in *fasciatus*). Insufficient observations have been made on *Dactuliothrips* (their larvæ have not thus far been collected) to make any definite statement, although the members of this genus almost certainly have the same type of life history as the other æolothripids in this area. *Melanthrips* does not occur in North America. European records of this latter genus do not mention the pupal stage; the pupa of the very common *M. fuscus* (Sulzer) is unknown. The collection dates, however, indicate that the seasonal history of *Melanthrips* (and *Rhipidothrips*) species is the same as *Æolothrips*. Biological data concerning the members of the fourteen other æolothripid genera are unknown.

In the Thripodea and related groups of Terebrantia the genus *Anaphothrips* is the only one reported up to this time to exhibit the cocoon-spinning capacity. The species mentioned by Karny is unknown and to the writer's knowledge the generic identification was not based on adults. During the spring of 1939 the writer reared large numbers of a *Heterothrips* collected from wild grape flowers, which spun cocoons. This species has only one generation a year. The well-known pear thrips, *Tæniothrips inconsequens* (Uzel), has a life history (one generation a year) similar to the æolothripid genera *Ankothrips*, *Orothrips*, etc.—at least those known in California. It is to be noted that the larva of *T. inconsequens* (while not spinning a cocoon) forms an earthen cell with the tip of the abdomen. From intensive collecting and field observations, it is surmised that *Odontothrips loti* (Hal.) and *Oligothrips oreios* Moulton, each with one annual generation only, either spin cocoons or form a protective cell in the soil beneath their hosts.

When the above-mentioned species (with the exception of *Anaphothrips*) are examined one is impressed by the fact that they all have tarsal or tibial hooks, or projections on the head or antennæ. This is also true of *Merothrips* species concerning which no life history data are available.

From these observations, incomplete as they are, it would appear that the Terebrantia (or at least certain known species which spin a cocoon or form an earthen cell) have developed (or retained) hooks or other anterior projections. These projections doubtless are used in aiding the adult to emerge and are not to be confused with the raptorial function. Also, a generalization which appears to be indicated by these facts is that the cocoon-spinning capacity is a characteristic of the ælothripids and has been retained by certain thripoid representatives which have one generation annually. As further biological data is obtained on additional species and new forms are described, the relationship of the higher groups of the Terebrantia may become more evident.

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NOTES ON SOME CICINDELIDÆ

(Coleoptera)

BY RICHARD G. DAHL

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Since the appearance of the description of *Cicindela willistoni* subsp. *amargosæ* Dahl¹, several specimens of this form have been collected far from the type locality. It seems desirable at this time to record this increase in range as well as to sepa-

¹Dahl, R. G., 1939, Bull. Brook. Ent. Soc., 34 : 221-222.

rate the subspecies from another distantly related form which, however, may be confused with it.

Two specimens in the M. A. Cazier collection were collected by Ira La Rivers at Reno, Nevada, in October, 1939. This is approximately 275 miles from the type locality. On May 29, 1939, P. C. Ting, M. A. Cazier, J. A. Downes and T. Aitken, collected eighteen specimens of *amargosæ* on saline flats at Gerlach, Washoe County, Nevada. And, on May 30, 1939, the same collectors collected five specimens at Cedarville, Modoc County, California. This increases the distance from the type locality, at Furnace Creek, Death Valley, California, to approximately 400 miles; the distance being measured directly between the two points. This known distribution places it as a likely representative of the Great Basin group, as outlined by M. A. Cazier² in his review of the *willistoni*, *fulgida*, *parowana*, and *senilis* groups.

The specimens from Gerlach, Nevada, vary slightly from those in the type series in that they are more cupreus. One dark blue-green specimen tends to grade into specimens from Cedarville, California, which are dark purple and coal black. The specimens from Reno, Nevada, are entirely coal black, except for white apical elytral spot.

The appearance of the black form at once suggests *Cicindela plutonica* Csy. However, *amargosæ* is readily separable from it by the following characters.

In *amargosæ* the labrum is faintly toothed and in all examples available is white. The maxillary palpi vary from glabrous to very sparsely pilose. The black form is sericeous black. The apical spot is wide and always present. The middle transverse band is never present. There is a distinct subsutural row of foveæ turning outward apically and joining with a row of distinct marginal foveæ.

In *plutonica* the labrum is distinctly toothed, and in a majority of the examples studied is black. The first joint of the maxillary palpi is densely pilose, the rest sparsely pilose. The elytra are dull black, with the apical spot thin or almost lacking. The middle transverse band is distinct or indistinct, but always present. There is a faint subsutural row of foveæ, but no marginal foveæ.

²Cazier, 1936, Bull. So. Calif. Acad. Sci., 35: 156-163.

A PRELIMINARY STUDY OF THE SUBGENUS
LEPTOCHILUS IN NORTH AMERICA

(Hymenoptera, Vespidae)

BY RICHARD M. BOHART

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The small and commonly red marked *Odynerus* of the subgenus *Leptochilus* are abundantly represented in North America, where the majority of the species are found in the arid regions of the southwest. However, they are scarce in collections because of their small size and unobtrusive habits. In a previous paper¹ I outlined the characters of the subgenus and redescribed an eastern species, *republicanus* D. T. The North American *Leptochilus* can be divided into about a dozen well defined species groups on the basis of structural characters. The present paper includes five of these groups and the others will be treated at a later date.

Much of the material used in the preparation of this paper was obtained through the cooperation of the U. S. National Museum, Museum of Comparative Zoology at Harvard, California Academy of Sciences, Academy of Natural Sciences at Philadelphia, University of Kansas, Washington State College, Oregon State Agricultural College, Colorado State College, and Pomona College. Individuals who were of greatest assistance through loan or donation of specimens were J. Bequaert, P. H. Timberlake, G. E. Bohart, E. G. Linsley, and C. D. Michener.

My attention has been called by Jos. Bequaert to the correct dates of *Leptochilus* and *Parodynerus* which I previously cited as 1852 and 1856.

Genus ODYNERUS Latreille, subgenus LEPTOCHILUS Saussure.

Leptochilus Saussure, 1853. Etud. Fam. Vesp., 1:233.

Parodynerus Saussure, 1855. Etud. Fam. Vesp., 3:245.

Microdynerus Thomson, 1874. Scandinaviens Hymenoptera, 3:58.

Zendalia Robertson, 1928. Flowers and Insects, p. 12.

KEY TO THE RUFINODUS GROUP

1. Pronotal angles projecting strongly outward and forward; first abdominal tergite almost invariably red marked; female clypeus

¹Bohart, R. M., Notes on *Odynerus* with a key to the North American subgenera and description of a new subgenus. Pan-Pac. Ent., 15:97-104, July, 1939.

- and mandibles of both sexes usually for the most part black; distance between apical teeth of male clypeus as great as length of third antennal segment (Pacific Slope).....*rufobasilaris*
- . Pronotal angles not strongly projecting forward and outward; distance between apical teeth of male clypeus less than length of third antennal segment.....2
2. First tergite light red except at apex (first tergite very rarely black), pale markings whitish, mandibles usually reddish, first two tergites of female and first three of male usually apically banded (western U. S.).....*rufinodus*
- . First tergite black and yellow, or marked with dark reddish; pale markings often tending toward orange.....3
3. Black and pale yellow; first five abdominal tergites (at least) apically banded (Arizona).....*trachysomus*
- . Markings tending toward orange; first and second tergites (at most) apically banded.....*republicanus*

This group may be distinguished by the following sum of characters: The postscutellum has a distinct sharp transverse crest, the female mandible is four toothed, the inter-ocellar area has two oblique swellings, and the second sternite is more than twice as broad as long but lacks a basal median suture.

The four North American species may also be separated on the basis of the male genitalia as figured.

ODYNERUS RUFINODUS Cresson

Odynerus rufinodus Cresson, 1868. Tr. Amer. Ent. Soc., 1:181 (holotype, female, A.N.S.P.).

I have seen specimens from Texas, New Mexico, Kansas, Colorado, Utah, Wyoming, Arizona, and California. A rare form with black instead of red on the first tergite is known to occur with the red forms in Texas, Wyoming, and California. The subapical hooks of the male ædeagus project sharply backward in contrast to those of *rufobasilaris*. The parameres are similar to those figured for *republicanus*.

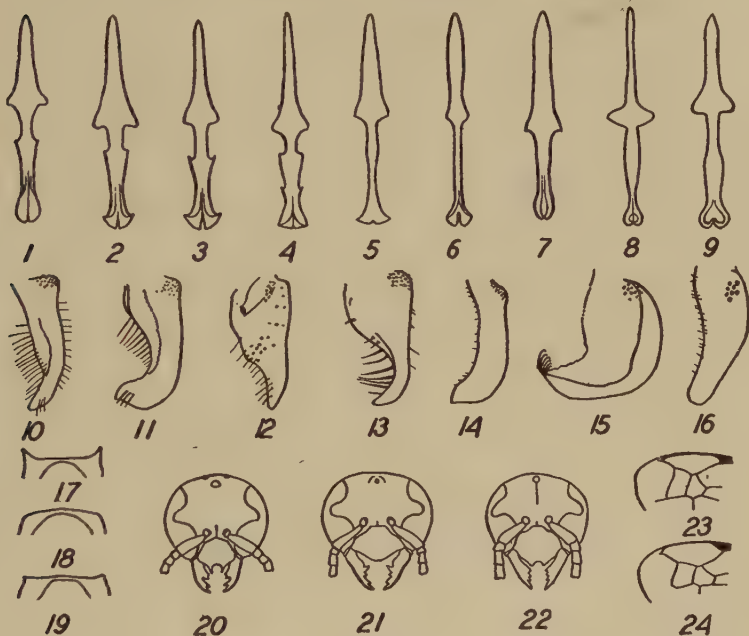
ODYNERUS RUFOBASILARIS Ashmead

Odynerus rufobasilaris Ashmead, 1896. Psyche, 7:335 (types, U.S.N.M.).

Odynerus bruesi Cameron, 1909. Pom. Jour. Ent., 1:81.

This species is widespread in California where I have seen specimens from Siskiyou, Shasta, Trinity, Tahoe, Tuolumne, Mariposa, Sonoma, Kern, Los Angeles, Riverside, and San Bernardino counties. I also have a record from Grand Coulee, Co-

lumbia River, Washington, July 12, 1902. Northern specimens sometimes have the first tergite black instead of reddish. The projecting pronotal angles are diagnostic. The male parameres are similar to those figured for *republicanus*.



North American species of *Odynerus*, subgenus *Leptochilus*. Top row, dorsal view of aedeagus of: 1, *republicanus*; 2, *rufobasilaris*; 3, *rufinodus*; 4, *trachysomus*; 5, *erubescens*; 6, *rubicundulus*; 7, *lissosomus*; 8, *tylocephalus*; 9, *minutissimus*. Middle row, dorsal view of right paramere of: 10, *republicanus*; 11, *trachysomus*; 12, *erubescens*; 13, *rubicundulus*; 14, *lissosomus*; 15, *tylocephalus*; 16, *minutissimus*. Bottom row, left, front margin of female prothorax from above of: 17, *rufobasilaris*; 18, *erubescens*; 19, *rubicundulus*; center, front view of male head and basal antennal segments of: 20, *lissosomus*; 21, *trachysomus*; 22, *minutissimus*; right, apical portion of female anterior wing of: 23, *erubescens*; and 24, *monotylus*.

ODYNERUS REPUBLICANUS Dalla Torre

Leptochilus ornatus Saussure, 1853. Etud. Fam. Vesp., 1:233 (nec Smith).

Odynerus republicanus Dalla Torre, 1889. Wien. Ent. Zeit., 8:125.

Odynerus zendaloides Robertson, 1901. Tr. Amer. Ent. Soc., 27:202.

I have seen specimens from South Carolina, Virginia, New Jersey, New York, Massachusetts, Ohio, Missouri, Texas, Kansas, Colorado, and Nebraska. Southern specimens usually have the first abdominal tergite marked with red. Northern specimens have this tergite either very dark red or black. It is the latter variety that Robertson named *zendaloides*.

Odynerus trachysomus Bohart, new species

Male. Black; clypeus, first antennal segment in front, anterior margin of pronotum except at middle, tegula except central spot, mesopleural spot, two spots on scutellum, front femur and all tibiae partly, apical margins of first six tergites and second sternite, ivory yellow; mandible apically, tarsi, wing veins and clouded area along front wing margin, brownish. Pubescence of clypeus very short, sparse, and silvery; that of rest of body obscure, dull silvery. Punctuation coarse and moderately dense, punctures of head and thorax mostly less than a puncture diameter apart, front face of pronotum sparsely punctured, first two tergites with smooth apical margins bordered inwardly by a zone of very large punctures. Head cubicle; mandible four-toothed, the basal tooth large and sharp; antennal hook somewhat flattened, reaching to apex of tenth segment; clypeus strongly convex, minutely incised apically; oblique inter-ocellar tubercles prominent. Pronotal angles about 90 degrees, projecting slightly forward and outward; postscutellum sharply carinate, propodeum untoothed above. First two tergites raised apically; second tergite twice as broad as long and with a broad basal concavity; ædeagus abruptly inflated apically and with a sharp pair of subapical hooks visible in dorsal view. Length to apex of second tergite, 9 mm.

Female. Markings, pubescence, and punctuation about as in male with exceptions as follows: Clypeus yellow at base only, first five tergites apically banded. Mandibles stout, short, and four-toothed; clypeus minutely incised apically; third antennal segment one and one-half as long as second; second sternite two and one-half times broader than its median length; length to apex of second tergite, 9 mm.

Holotype, male, Santa Rita Mts., Ariz., July 17, 1932 (R. H. Beamer); allotype, female, Santa Rita Mts., Ariz., June (F. H. Snow). Paratypes, three females, Baboquivari Mts., Ariz., Aug., 1924 (O. C. Poling). Holotype and allotype to be returned to the University of Kansas, paratypes in collections of the California Academy of Sciences and the author.

Readily recognizable by its more extensive and ivory colored markings. From *republicanus*, its nearest ally, *trachysomus* also differs in the structure of the male genitalia.

TYLOCEPHALUS GROUP

The two North American species comprising this group are distinguished by having a single swelling on the vertex between the posterior ocelli. Also, the second sternite has the median basal suture faint or absent, there is a small sharp tubercle between and above the antennal bases, the propodeum is untoothed, the postscutellum is sharply crested, the female mandible is four-toothed, and the middle femur of the male is depressed beneath toward the base. The group is represented in Central and South America by several species among which is *acolhuus* Saussure.

Odynerus tylocephalus Bohart, new species

Black; top of mandible, first two antennal segments, prothorax, tegula, mesopleural spot, scutellum and postscutellum, propodeum mostly, legs, first abdominal segment, apical border of second segment, reddish yellow to reddish; wings dark smoky, hind wing apically spotted. Pubescence pale and short except for a single apical row of long hairs on sternites three to six in male and three to five in female. Body closely and coarsely punctured, less so on abdomen. Third antennal segment shorter than fourth; hook of male antenna small, flattened, reaching about half the length of eleventh segment; mandible four-toothed in both sexes; clypeus of male about as long as broad, angularly incised between apical teeth; clypeus of female broader than long; tubercle of vertex dulled by minute punctures; pronotal angles sharp and slightly obtuse as seen from above; middle femur of male contorted, depressed beneath before the middle; third submarginal cell of fore wing almost as broad as high; first abdominal tergite raised apically; ædeagus as figured; parameres with a row of bristles apically and rows of thick short setæ along inner side basally; length to apex of second tergite, male 6 mm., female 6.5 mm.

Holotype, male, and allotype, female, Palm Beach, Florida (C. F. Baker collection). Seventeen paratypes from the following localities in Florida: Palm Beach, Sanford, Coconut Grove, Fort Mead, Upper Matecumbe Key, Lower Matecumbe Key, Bra-dentown, Miami, Key Biscayne, Cape Sable road, Key Largo, and Paradise Key; one paratype from Jekyl Island, Georgia. Holotype and allotype to be returned to the U. S. National Museum, paratypes in the collections of the California Academy of Sciences, Museum of Comparative Zoology at Harvard, University of Kansas, Washington State College, J. Bequært, and the author.

In general appearance *tylocephalus* resembles two other species from Florida which belong, however, to the subgenus *Stenodynerus*. These are *histrion* Lepeletier and *anacardivora* Rohwer. The tubercle of the vertex and the lack of pronotal pits easily differentiate *tylocephalus*.

***Odynerus monotylos* Bohart, new species**

Male. Black; clypeus, first antennal segment in front, front margin of prothorax, mesopleural spot, band across scutellum, tibiae and tarsi partly, apical margins of first tergite and second segment of abdomen, yellow; tegula reddish; wings dark stained, slightly violaceous, hind wing spotted apically, pubescence pale and short except for rows of long hairs on apices of third to sixth sternites. Puncturation coarse and close, becoming finer on abdomen. Third antennal segment shorter than fourth; antennal hook small, flattened, reaching about half the length of eleventh segment which is concave beneath; clypeus almost as long as broad, roundly incised between apical teeth; tubercle of vertex dulled with minute punctures; pronotal angles sharp and slightly obtuse as seen from above; middle femur contorted, depressed beneath before the middle; third submarginal cell of fore wing almost as broad as high; first abdominal tergite raised apically; aedeagus and parameres about as figured for *tylocephalus*, parameres with a row of bristles apically and rows of thick short setae along inner side basally; length to apex of second tergite, 6.5 mm.

Female. General characters about as in male except as follows: Clypeus black, markings of head and thorax tending toward red, apex of third tergite yellow-banded. Length to apex of second tergite, 6.5 mm.

Holotype, male, Chatsworth, New Jersey, July 6, 1935; allotype, female, South Hill, Virginia, June 2, 1917. Eighteen paratypes from the following localities: Stony Brook reservation, Massachusetts; Fort Lee and Alpine, New Jersey; Long Island and Millwood, New York; South Hill, Virginia; Black Mt., North Carolina; Greenville, South Carolina; Atlanta, Georgia; Mobile, Alabama; Fedor, Mineola, Cameron Co., New Braunfels, and McDade, Texas; Tempe, Arizona; mountains near Claremont, California. Holotype and allotype to be deposited in the California Academy of Sciences, paratypes in the collection of U. S. National Museum, Museum of Comparative Zoology at Harvard, University of Kansas, Pomona College, J. Bequaert, and the author.

The entirely different markings of *monotylus* should differentiate it from *tylocephalus*. Structurally the two appear to be practically identical. Some specimens of *monotylus* have more of the abdominal segments banded. Also, the hind margin of the prothorax may be partially yellow-bordered.

MINUTISSIMUS GROUP

So far this group is known only from a single species which contains the smallest specimens of *Odynerus* that I have seen. It is structurally similar to the *tylocephalus* group but lacks the tubercle of the vertex, the sharp tubercle between the antennal bases, and the depressed middle femur of the male, as well as possessing a different type of male genitalia.

Odynerus minutissimus Bohart, new species

Black; clypeus in male and basal spot of clypeus in female, apex of male antenna beneath, prothorax in front, tegula, mesopleural spot, band across scutellum, legs partly, apical bands on first tergite and second segment of abdomen, pale yellow; wings smoky and slightly violaceous, apical cell dark. Pubescence short, sparse, and silvery; apical abdominal segments fringed with moderately long hairs. Puncturation moderate, punctures mostly about one puncture diameter apart, apices of first two tergites smooth. Third and fourth antennal segments subequal; male antennal hook reaching base of eleventh segment; clypeus almost as long as broad, shallowly excavated apically; pronotal angles moderate, obtuse; first tergite, and second sparingly, raised apically; second sternite more than twice as long as broad; genitalia as figured; length to apex of second tergite, male 4 mm., female 5 mm.

Holotype, male, Indio, Riverside Co., Calif., Apr. 7, 1936, at mesquite flowers (P. H. Timberlake); allotype, female, Palm Springs, Riverside Co., Calif., Apr. 15, 1938 (G. E. and R. M. Bohart). Eighteen paratypes from the following localities in California: The Narrows, San Diego Co.; Whitewater, Andreas Canyon, Palm Springs, Indio, Mecca, Dos Palms, and Shavers Well, Riverside Co.; Furnace Creek (Death Valley), Inyo Co. One female paratype, Glendale, Nevada, June 15, 1930, on *Covillea tridentata* (E. W. Davis). A single specimen in my collection bears the data, Arizona (C. F. Baker). Holotype and allotype to be deposited in the California Academy of Sciences, paratypes in the collections of U. S. National Museum, J. Bequaert, P. H. Timberlake, E. G. Linsley, and the author.

LISSOSOMUS GROUP

The structural characters given for *minutissimus* for the most part apply here also. However, this group has the second tergite broader than long and the puncturation of the body exceedingly fine. In addition to the single species of the group in North America, I have seen two European species, *timidus* Saussure and *nugdunensis* Saussure, which definitely belong to it. The former can hardly be separated specifically from *lissosomus* but is somewhat more heavily punctured.

Odynerus lissosomus Bohart, new species

Male. Black; mandible except for reddish apex, flagellum beneath, prothorax in front, tegula, mesopleural spot, spots on scutellum, legs partly, apical bands on abdominal tergites and second and third sternites, pale whitish yellow; flagellum above, apex of mandible, scutellum mostly, postscutellum, propodeum except superior face, legs partly, first two abdominal segments mostly, other segments partly, reddish; wings slightly smoky. Pubescence short, sparse, and silvery. Body minutely punctured, appearing smooth except under high magnification. Clypeus very deeply and roundly incised apically; mandible deeply notched between second and third teeth, antennal hook minute, reaching half the length of eleventh segment; pronotal angles moderate, obtuse; first abdominal tergite somewhat raised apically; ædeagus short, with a thick neck, cleft apically; parameres paddle-shaped and almost hairless, ending far below apex of ædeagus; length to apex of second tergite, 5 mm.

Female. Markings, pubescence, and puncturation about as in male with the following exceptions: Clypeus black except at base; mandible, antenna beneath, prothorax mostly, mesopleuron partly, reddish; third and following abdominal segments dark brown. Mandibular teeth regular, clypeus with a small apical incision; length to apex of second tergite, 5.5 mm.

Holotype, male, Palm Springs, Riverside Co., Calif., Apr. 24, 1938 (P. H. Timberlake); allotype, female, Riverside, Riverside Co., Calif., Apr. 11, 1934, on *Eriogonum fasciculatum* (P. H. Timberlake). Paratypes, one male and six females, Claremont, Los Angeles Co., Calif. (C. F. Baker); one female, Palm Springs, Riverside, Co., Calif., Apr. 16, 1939 (R. M. Bohart); one male, Mt. Diablo, Contra Costa Co., Calif., Apr. 24, 1937 (G. E. and R. M. Bohart). Holotype and allotype to be deposited in the California Academy of Sciences, paratypes in the collections of Pomona College, P. H. Timberlake, and the author.

ERUBESCENS GROUP

This group may be recognized by the following combination of characters. The second sternite may or may not have a crease-like basal median suture, the postscutellum is sharply crested, no inter-ocellar or vertex tubercles are present, the horizontal portion of the first tergite is sparsely punctured and shining, the second abdominal sternite is broader than long, the female mandible is four-toothed, and the middle femur of the male is normal. Only two species of the group are known at present.

Odynerus erubescens Bohart, new species

Male. Black; clypeus, first antennal segment in front, front margin of prothorax, tegula mostly, legs partly, apices of first tergite and second to sixth abdominal segments, whitish yellow; antenna apically, propodeum, legs partly, first abdominal segment mostly, red; wings brown stained, especially in apical cell. Pubescence short and silvery. Punctuation of head and thorax moderate, punctures separated by about one puncture diameter; clypeus hardly punctured; punctuation of abdomen fine, heaviest toward apex of second tergite. Clypeus much broader than long, roundly incised between the tiny apical teeth, width of emargination less than length of fifth antennal segment; mandible evenly four-toothed; antennal hook slender, sharply pointed, and reaching to base of eleventh segment, second to fourth segments subequal in length; pronotal angles rounded slightly, not projecting forward; middle femur normal; propodeum with an indistinct tubercle near angles of postscutellum; first abdominal tergite slightly raised and smooth apically; second sternite with a distinct crease-like basal median suture; ædeagus as figured; parameres with slender bristles along their inner curved surfaces; sheath of lateral spine elongate, rounded, and bristleless apically; length to apex of second tergite, 5 mm.

Female. Markings, pubescence and punctuation about as in male with following exceptions: Clypeus and third to sixth abdominal segments black; mandible and postscutellum red; legs red and black. Clypeus narrowly and shallowly incised between apical teeth; length to apex of second tergite, 6 mm.

Holotype, male, Riverside, Riverside Co., Calif., Apr. 15, 1932, on *Lotus scoparius* (P. H. Timberlake); allotype, female, Riverside, Calif., May 21, 1925, on *Eriogonum fasciculatum* (P. H. Timberlake). Forty-five paratypes from the following localities in California: Campo, San Diego Co.; Palm Springs

and Riverside, Riverside Co.; Claremont, Whittier, Pasadena, Altadena, Azusa, La Crescenta, Palmdale, and Lancaster, Los Angeles Co.; Crestline, San Bernardino Co.; Argus Mts., Mazurka Canyon, and Lone Pine creek, Inyo Co.; Tallac Lake, Placer Co. Seven paratype females, Buckeye, Arizona, Mar. 28, 1934, on *Lycium torreyi* (P. H. Timberlake). Other recorded host plants are *Lotus glaber*, *Lotus agrophyllus*, and *Baccharis viminea*. Atypical specimens with black instead of red on the first tergite are in my collection from Buckeye, Arizona; Berkeley, Alameda Co. and Mt. Diablo, Contra Costa Co., California; Klamath Falls, Oregon; Pullman and Wawawai, Washington. Pullman specimens bear the additional data "reared from larvæ in stems of *Sambucus glauca*." Holotype and allotype to be deposited in the California Academy of Sciences, paratypes in collections of U. S. National Museum, Pomona College, J. Bequært, P. H. Timberlake, E. G. Linsley, C. D. Michener, and the author.

Odynerus rubicundulus Bohart, new species

Male. Black; clypeus except apically, first antennal segment in front, spot on mandible, pronotum in front, mesopleural spot, lateral spot on scutellum, legs partly, whitish yellow; tegula mostly, apical margins of first tergite and second and third abdominal segments, whitish; antenna beneath and legs partly, brownish red; first abdominal segment red except for apical band; wings nearly clear except in apical cell. Pubescence obscure, silvery. Puncturation moderate; sparse on clypeus, propodeum, and first tergite; elsewhere punctures mostly separated by at least a puncture diameter; first and second tergites apically smooth. Clypeus much broader than long, roundly incised between apical teeth, the width of emargination as great as length of fifth antennal segment; mandible evenly four-toothed; antennal hook moderately slender, pointed apically and reaching to base of eleventh segment, second to fourth segments subequal in length; pronotal angles rounded, slightly but distinctly projecting forward as seen from above; middle femur normal; propodeum with an indistinct tubercle near angles of postscutellum; first and second abdominal tergites slightly raised apically; second sternite without a median basal suture; ædeagus as figured; parameres with long stout bristles along their inner edges; sheath of lateral spine elongate, whip-like, and with a single terminal bristle; length to apex of second tergite, 5.5 mm.

Female. Markings, pubescence, and puncturation about as in

male with following exceptions: Mandible red, clypeus black; propodeum mostly red; third abdominal segment without apical band. Clypeus well punctured and with a small apical incision; length to apex of second tergite, 6.5 mm.

Holotype, male, allotype, female, and three paratype females, Lone Pine creek, Inyo Co., Calif., June 6, 1939 (R. M. Bohart); paratypes, two males, Olancho, Inyo Co., Calif., May 20, 1937 (J. W. Johnson and N. W. Frazier); one male and one female, Altadena, Los Angeles Co., Calif. (C. D. Michener); one female, Mariposa, Mariposa Co., Calif., June 13, 1938 (R. M. Bohart). Holotype and allotype in California Academy of Sciences, paratypes in collections of U. S. National Museum, C. D. Michener, and the author.

This species is easily separated from *erubescens*, which it resembles superficially, by the absence of the median basal suture of the second sternite, the forward projecting pronotal angles, the broader emargination of the male clypeus, and differences in the male genitalia.

A CONOPID FLY PARASITE OF MEGACHILE

(Hymenoptera, Apoidea)

While excavating for *Microbembex* cocoons in the sand dunes near Antioch, California, October 16, 1938, a dead male *Megachile* (*Xanthosaurus*) *perihirta* Cockerell¹ was taken from the end of a short burrow in a hard packed sand cliff. No evidence of megachilid cells was present which indicates that the bee was occupying a "resting burrow" (a common habit of male bees) when killed by the pupation of the conopid fly parasite, *Conops argentifacies* Van Duzee² within its abdomen.

The bee was put in a small vial with a cotton plug. The conopid emerged on March 15 but in a very stunted and undeveloped condition.—George E. Bohart and John W. MacSwain, University of California.

¹ *Megachile perihirta* Cockerell, 1893, Ann. Mag. Nat. Hist., (7), 1:126.

² *Conops argentifacies* Van Duzee, 1927, Proc. Cal. Acad. Sci., (4), 16:574-575.

NOTES ON TWO CHRYSIDIDS PARASITIC ON
WESTERN BEMBICID WASPS

(Hymenoptera)

BY GEORGE E. BOHART AND JOHN W. MACSWAIN

University of California, Berkeley

In the spring and fall of 1938 and 1939 we collected a number of aculeate Hymenoptera from the sandy areas of Emeryville and Antioch, California. From the former locality several cocoons of the sand wasp, *Bembix comata* Parker¹ were obtained while at Antioch several hundred cocoons of *Microbembex aurata* Parker² were collected. All of these were brought into the laboratory and opened for examination or placed in bottles for rearing. Of the *Bembix comata* cocoons examined, about thirty per cent contained the brown silken cases of the chrysidid wasp, *Parnopes edwardsii* (Cresson)³. Approximately the same ratio of parasitism was obtained from unopened cocoons which later emerged. The pupal cases of *Microbembex aurata* were studied in the same manner and were found to be twenty per cent parasitized by *Parnopes westcotti* Melander and Brues⁴.

In the field neither species of parasite appeared for at least two weeks after the emergence of its host but the parasites remained active for as long a period after the bembicids were gone. *Parnopes edwardsii*, which is a large, brilliant green species, was found to frequent the blossoms of two sweet clovers, *Melilotus alba* Desr. and *Melilotus indicus* All. The host wasp also visited these flowers. On cloudy days and at night many of the parasites remained hidden beneath loose objects on the sand where they often fell victims to the black widow spider, *Latrodectus mactans* Fabricius, which made its webs in these situations. *Parnopes westcotti*, a smaller green and bronze wasp, was found most commonly at flowers of the small bush, *Croton californicus* Mull., which also attracted many *Microbembex*.

¹*Bembix comata* Parker, 1917, Proc. U. S. Nat. Mus., 52:100.

²*Microbembex aurata* Parker, 1917, Proc. U. S. Nat. Mus., 52:121.

³*Euchraeus edwardsii* Cresson, 1879, Proc. Amer. Ent. Soc., 7:iv.

⁴*Parnopes westcotti* Melander and Brues, 1902, Biological Bulletin, Lancaster, 3:39.

The habits of both parasites in searching for host cocoons are apparently nearly the same. The activities of *Parnopes westcotti* were more completely studied because of the relatively large population of that species. A greater concentration of host burrows allowed it a large share of time for actually digging into host entrances. In contrast, *Parnopes edwardsii* had to search over large areas of sand in order to discover the scattered burrows of its host. While searching, the wasps made short flights close to the sand, alighting frequently to run over the surface, tap rapidly with the tips of their antennæ, and examine every depression. At frequent intervals the wasps would scratch the surface of the sand with their anterior tarsi and, upon finding what was apparently a host entrance, would tunnel their way beneath the loose top sand. The digging efforts of both species are interesting because of their ineffectiveness. In contrast to other aculeates these wasps have neither well developed mandibles nor tarsal combs and have restricted use of their front legs. When starting to dig, the body is raised to an almost vertical position from which they often lose their balance and fall over backwards.

Our observations indicate a striking host specificity for these parasites in the localities studied. At Antioch *Bembix comata* is scarce whereas *Bembix occidentalis beutenmuelleri* Fox is quite abundant. *Parnopes edwardsii* is even rarer at this locality than *Bembix comata* which is, therefore, apparently its only host. In addition, this parasite has never been found in the many cocoons of other *Bembix* from Antioch which have been examined⁵. *Parnopes edwardsii* has a wider geographical range than *Bembix comata*, however, and has been collected on sweet clover at Walla Walla, Washington, in company with *Bembix amœna* Handlirsch. *Parnopes westcotti* has not been taken from *Bembix* cocoons but will most likely be found as a parasite of the common and wide ranging *Microbembex monodonata* Say, since these two have been collected together in the absence of *Microbembex aurata*. At Emeryville both species of *Microbembex* are present but are not parasitized by chrysidids.

⁵Bohart, G. E., and J. W. MacSwain, 1939. The life history of the sand wasp, *Bembix occidentalis beutenmuelleri* Fox and its parasites. Bull. South. Calif. Acad. Sci., 38:84-98.

FLEAS OF EASTERN UNITED STATES

Fleas of Eastern United States. Irving Fox. The Iowa State Collegiate Press. 191 pp. 31 plates. 1940. \$3.00.

This book is confined to a consideration of the fleas reported from the United States east of the one hundredth meridian exclusive of Texas and is apparently a thesis written in partial fulfillment of the requirements for a doctorate. A good bibliography is given for each species. The specific descriptions are brief but adequate except for the allocation of new species closely related to one or more previously described and for the determination of certain species not earlier reported from the eastern United States. The illustrations are adequate with the exception of the one denoting female structures. Unfortunately no fully labeled drawing of a male is given. The absence of entirely satisfactory illustrations showing morphologic detail is a serious handicap to a beginning student of Siphonaptera.

The locality and host records are as complete as one might reasonably expect in view of the fact that so many of these records have not been published and therefore are not readily available. The author lists these records under both "Records" and "Eastern localities" which is somewhat confusing until one recognizes that the former designation apparently applies only to specimens examined by the author and the latter to records made by other workers.

Subspecies are either ignored or barely mentioned. *Foxella ignotus*, for example, is treated as if it were one of several species in the genus rather than the only species with several subspecies.

The keys are accurate and clear; however, it would have been more desirable if they had been expanded to include species occurring over a wider geographic range. Such an expansion would have done a great deal to eliminate possible confusion arising from the study, with the aid of this book, of new species or species not previously reported from the east.

Tunga penetrans (L.), despite the statement in the book, has been authentically recorded from Florida and Texas. *Opisocrostitis hirsutus* (Bak.), *Orchopeas labiatus* (Bak.), and *O. nepos* (Roths.) occur in the area considered by the author.

The allocation of *Monopsyllus vison* (Bak.) and *M. wagneri* subsp. to the genus *Megabothris* is unwarranted. *Corrodopsylla* has been raised to a generic status; therefore, "*Doratopsylla*" *curvata* Roths. is *Corrodopsylla curvata*. *Epitedia testor* (Roths.), although described, is not included in the key to the species of *Epitedia*.

Unfortunately no key is given for the genus *Ceratophyllus*. It is true, as the author indicates, that the characters of species belonging to this genus do not lend themselves as well to a key

as do the species of most other genera, but adequate keys for the species of this genus have been made.

In several instances where only one species of a genus is known to occur in the United States, the author writes as if but one species occurs in the east and other species of the genus occur in the west.

A synonymic list is included at the back of the book but it is arranged alphabetically according to synonyms. This makes it difficult to find all of the synonyms of a given valid species. A very good list of the eastern fleas arranged according to the hosts from which they have been recorded is given.

This book will be very useful in determining described fleas occurring commonly in the eastern United States but its use is very limited as an aid in taxonomic research of this group of insects.—M. A. Stewart.

CARABUS TÆDATUS FABR. AND ITS SUBSPECIES VAN- COUVERICUS CSIKI OR BICOLOR WALKER ARE IDENTICAL

(Coleoptera, Carabidæ)

BY ROBERT Y. PRATT

Coupeville, Washington

Carabus (*Archicarabus*) *tædatus* Fabr. is listed in Leng's "Catalogue of North American Coleoptera" as occurring in Alaska. When occurring in the State of Washington it is referred to as the subspecies *vancouvericus* Csiki¹ or *bicolor* Walker¹.

A series of forty-one *Carabus tædatus* that I collected within seven days in a single nineteen-acre field on Whidbey Island, State of Washington, have the color of the elytra ranging from brown to distinct black. Comparison of this series with two specimens of the typical form² of *tædatus* from Kodiak Island, Alaska, and other specimens of *Carabus tædatus* in the Hatch collection at the University of Washington, Seattle, conclusively proved that the Kodiak Island and the Washington specimens of *tædatus* described as the subspecies *vancouvericus* Csiki or *bicolor* Walker were identical. Therefore the subspecies *vancouvericus* Csiki and *bicolor* Walker should be relegated to synonymy.

¹Leng, Charles W., Catalogue North American Coleoptera, p. 44, Catalogue No. 169 and 169b, 1920. Also Ibidem, Second and Third Supplements, p. 10, section under *Carabus*, 1933.

²Roschke, Dr. H.—Berlin, *Carabus tædatus* F., Entomologische Nachrichten XXVI, 1900. Februar 1900, No. 4, p. 57.

Kodiak Island, Alaska, is about one hundred and seventy-five miles from the beginning of the Aleutian Island peninsula, or Unalaska, where the type specimen of *Carabus tædatus* Fabr. was found. Hence the Kodiak Island specimens of *tædatus* in the Hatch collection are the typical form. Both the brown and the black elytra are found in *Carabus* (*Archicarabus*) *tædatus* Fabr. from the Alaskan region.

HOPLIA MISCELLANY

(Coleoptera, Scarabæidæ)

BY L. B. BOYER

From the descriptions of *Hoplia maculifera* Moser⁵ and *H. philippensis* Moser,⁶ one could not surely differentiate between the two species. They might be interpreted as being but scale variations within a single protean species. However, the holotype of *maculifera* (number 7225, Philippine Bureau of Science, Entomology) has posterior tarsal claws which are distinctly cleft at the tip while those of *philippensis* (Holotype number 6026, Philippine Bureau of Science, Entomology) are entire. These insects represent different species.

In a recent note¹ the author erred in his interpretation of synonymy in a Central American *Hoplia*. Whereas he accepted the Junk Catalogue listing "*H. argentata* Geoffroy"³ and thus regarded *argentata* Nonfried⁷ a homonym, the Geoffroy insect is *argentea*, having been described as *Scarabæus argenteus*⁴. Therefore, *argentata* Nonfried is the correct name for the species.

In "A Revision of the Species of *Hoplia* Occurring in America North of Mexico"², the type locality of *meridionalis* Boyer was omitted. The labels on the holotype read as follows: "Alachua County, Fla., IV-17-1938, F. Young" and "Lake Newman Biol. Station, Gainesville, IV-17-38." On one group of paratypes the labels are: "Sanford, Fla., Mch. 8, 1927, F. M. Uhler," and "L. W. Saylor Collection." The other group of paratypes is labeled: "Meggett, S. C., 26-May-1934, O. L. Cartwright" and "from the O. L. Cartwright Collection."

¹Boyer, L. B., Pan-Pac. Ent., 16:11, 1940.

²Boyer, L. B., Microent., 5 (part 1):14, 1940.

³Dalla Torre, K. W. von, Junk Cat. Coleopt., 50:372, 1913.

⁴Geoffroy, E. L. (in Fourcroy, A. F. Entomologia Parisiensis, 1:8, 1785).

⁵Moser, J., Philippine Jour. Sci., 5:185, 1910.

⁶Moser, J., Philippine Jour. Sci., 5:184, 1910.

⁷Nonfried, A. F., Deut. Ent. Ztschr., p. 259, 1891.